BayRS Software Version 14.20

Part No. 308604-14.20 Rev 00
December 2000

4401 Great America Parkway
Santa Clara, CA 95054

Cable Guide

NORTEL NETWORKS™

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Preface

This guide describes how to attach the correct cables to the Nortel Networks™ router you are installing. This guide provides the following information:

- Cable connector diagrams
- Pin/socket wiring configurations

Text Conventions

This guide uses the following text conventions:

bold text	Indicates command names and options and text that you need to enter. Example: Use the **dinfo** command.
italic text	Indicates file and directory names, new terms, book titles, and variables in command syntax descriptions. Where a variable is two or more words, the words are connected by an underscore. Example: If the command syntax is: **show at** <*valid_route*> *valid_route* is one variable and you substitute one value for it.
`screen text`	Indicates system output, for example, prompts and system messages. Example: `Set Trap Monitor Filters`

Acronyms

This guide uses the following acronyms:

ATM	asynchronous transfer mode
AUI	attachment unit interface
CCITT	Consultative Committee on International Telegraph and Telephone (now ITU-T)
CPE	customer premise equipment
CSMA/CD	carrier sense multiple access/collision detection
CSU	channel service unit
DCE	data communication equipment
DSU	digital service unit
DTE	data terminal equipment
DTR	data terminal ready
EIA	Electronic Industries Association
FC	fiber channel
FDDI	Fiber Distributed Data Interface
FSD	fixed shroud duplex
HSSI	High Speed Serial Interface
IEEE	Institute of Electrical and Electronic Engineers
LAN	local area network
MAU	media access unit/multistation access unit
PMD	physical medium dependent
RJ	registered jack
SC	subscriber connector
STP	shielded twisted pair
WAN	wide area network

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Valbonne, France	33-4-92-96-69-68
Sydney, Australia	61-2-9927-8800
Tokyo, Japan	81-3-5740-1700

Chapter 1
Cable Basics

This guide provides all the information you need to find a specific cable for your Nortel Networks router hardware platform. This chapter explains:

- What you need to know
- How to use this guide
  - -- How to find cables by category
  - -- How to find cables by order number or description
  - -- How to cross reference older legacy cables to the newer style cables
- Some basics about cable connectors, including:
  - -- Connector terminology
  - -- Basic connector types
- How to build your own cables

If you want to build a cable to meet special requirements, this guide also provides pinout information and references to the appropriate documents for industry specification, standards, or recommendations. Recommended documents typically contain technical information to help you determine your requirements for cable installation path, cable type, maximum cable length, and so on.

Before You Begin

To ensure that you order, make, or use the appropriate cable for your router hardware platform, first answer the following questions:

- What is the connection category, order number, or physical description of the cable I want to find?
- What type of physical interface am I connecting to, and what type of cable connector (plug or receptacle) do I need to make this connection?

Note: Determining the connector type you need can significantly decrease the time it takes to locate the appropriate cable. For example, if you want to connect to a 44-position synchronous interface, look only for synchronous cables with 44-pin plugs.

- What type of device do I want to connect to the router hardware platform's physical interface? For example, do you want to connect a modem or a console to the router hardware platform? Each function requires a different cable, even though you connect to the same physical interface on the router hardware platform.
- What version of software is my router hardware platform using? For example, newer features such as dial-up services may require special cable pin configurations to interoperate with earlier versions of Nortel Networks software.

How to Use This Guide

You can find the Nortel Networks cable you want by:

- Cable connection category
- Cable order number or description
- Cross referencing model numbers and part numbers of the older legacy cables to the model numbers and part numbers of the newer style cables

Finding Cables by Category

This guide organizes Nortel Networks cables into seven connection categories. Table 1-1 shows the chapter that contains each category.

Table 1-1. Cable Category Locations

Category	Chapter
Console/modem	2
Local area network (LAN) • Ethernet • Token ring • Fiber Distributed Data Interface (FDDI) • Asynchronous transfer mode (ATM)	3
High Speed Serial Interface (HSSI)	4
Multichannel E1, T1, T1 framer, and channel service unit (CSU)	5
Standard synchronous • Coaxial • Crossover and loopback • Straight-through • Pass-through	6
Dial-up services	7
Cable adapters	8

After determining the connection category and type of connector that you need, go to the appropriate chapter. The table at the beginning of each chapter provides additional information about each cable in that category.

Finding Cables by Order Number or Description

Table 1-2 lists the order number, a brief description, and the page number of each cable in this guide.

Table 1-2. Cables Listed by Order Number

Order No.	Physical Cable Description	Page
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AA0018001	MCE1 DB9 to mod jack cable (9-pin to RJ-45)	5-4
AA0018002	MCE1 DB9 to unterminated end cable (9-pin to unterminated end)	5-5
AA0018003	X.21 synchronous pass-through (15-pin plug to X.21 receptacle)	6-5
AA0018004	X.21 synchronous pass-through (44-pin plug to X.21 recepplugtacle)	6-7
AA0018005	X.21 synchronous pass-through (50-pin plug to X.21 receptacle)	6-9
AA0018006	Quad MCT1 clock cable	5-6
AA0018011	RS-530 straight-through cable (15-pin to RS-530 plug)	6-11
AA0018012	RS-530 straight-through cable (44-pin to RS-530 plug)	6-13
AA0018013	RS-530 straight-through cable (50-pin to RS-530 plug)	6-15
AA0018014	MCE1 RJ-45 to RJ-45	5-7
AA0018015	MCE1 RJ-45 to unterminated end cable	5-8
AA0018021	Quad MCT1 crossover cable (15-pin D-sub plug to 15-pin D-sub plug)	5-9
AA0018022	Quad MCT1 straight-through cable (15-pin D-sub plug to 15-pin D-sub plug)	5-10
AA0018023	50-pin to V.28 cable	6-17
AA0018024	50-pin to 15-pin RS-422 cable adapter	8-16
AA0018040	ATM E1 RJ-45 to RJ-45 cable and Balun	5-11 8-18
AA0018041	44-pin plug to RS-232-C DCE receptacle	6-69
AA0018042	44-pin plug to RS-422 DCE receptacle	6-71
AA0018043	44-pin plug to RS-530 DCE receptacle	6-73
AA0018044	44-pin plug to V.28 DCE receptacle	6-75
AA0018045	44-pin plug to V.35 DCE receptacle	6-77
AA0018046	44-pin plug to X.21 DCE receptacle	6-79
AA0018047	44-pin to RS-232-C DTR	7-20
AA0018048	44-pin to RS-232-C loop timing	6-81

(continued)

Table 1-2. Cables Listed by Order Number *(continued)*

Order No.	Physical Cable Description	Page
AA0018049	44-pin to RS-232-C standard	6-83
AA0018050	44-pin to RS-422 DTR	7-22
AA0018051	44-pin to RS-422 loop timing	6-85
AA0018052	44-pin to RS-422 standard	6-87
AA0018053	44-pin to RS-530 loop timing	6-89
AA0018054	44-pin to RS-530 standard	6-91
AA0018055	44-pin to V.28 DTR	7-24
AA0018056	44-pin to V.28 loop timing	6-93
AA0018057	44-pin to V.28 standard	6-95
AA0018058	44-pin to V.35 DTR	7-26
AA0018059	44-pin to V.35 loop timing	6-97
AA0018060	44-pin to V.35 standard	6-99
AA0018061	44-pin to 44-pin crossover	6-101
AA0018062	44-pin to X.21 loop timing	6-103
AA0018063	44-pin to X.21 standard	6-105
DU0011008	68-pin DSYNC connector to dual 44-pin connector adapter	8-20
DU0011009	120-pin QSYNC connector to quad 44-pin connector adaper	8-23
7115	15-pin Ethernet/802.3 AUI plug to 15-position Ethernet/802.3 AUI receptacle	3-3
7116	15-pin D-sub plug to RS-422 plug (V.25bis)	7-4
7117	15-pin D-sub plug to RS-422 plug (raise DTR)	7-6
7118	15-pin D-sub plug to RS-232-C plug (raise DTR)	7-8
7119	15-pin D-sub plug to RS-232-C plug (V.25bis)	7-9
7120	15-pin D-sub plug to V.35 plug (V.25bis)	7-10
7121	15-pin D-sub plug to V.35 plug (raise DTR)	7-11
7122	44-pin to 15-pin RS-232-C cable adapter	8-3
7123	44-pin to 15-pin X.21 cable adapter	8-5
7124	44-pin to 15-pin V.35 cable adapter	8-7
7125	9-pin D-sub plug to token ring/802.5 MAU data connector (no ferrite bead); STP cable	3-4

(continued)

Table 1-2. Cables Listed by Order Number *(continued)*

Order No.	Physical Cable Description	Page
7126	9-pin D-sub plug to token ring/802.5 MAU data connector (with ferrite bead); STP cable	3-5
7128	9-pin D-sub plug to token ring/802.5 RJ-11 receptacle	3-6
7131	44-pin to 15-pin RS-422 cable adapter	8-9
7135	FDDI/X3T9.5 FSD to FSD; multimode fiber cable; dual attachment to FDDI ring requires two cables	3-7
7136	FDDI FSD to bayonet (ST) connectors; multimode fiber cable; dual attachment to FDDI ring requires two cables	3-7
7137	44-pin D-sub plug to V.35 plug (raise DTR)	7-12
7138	44-pin D-sub plug to RS-232-C plug (raise DTR)	7-14
7139	44-pin D-sub plug to RS-422 plug (raise DTR)	7-15
7150	MCT1 clock cable (9-pin D-sub plug to 15-pin D-sub plug)	5-12
7151	MCT1 loopback plug (15-pin D-sub plug)	5-13
7152	MCT1 loopback plug (RJ-48)	5-14
7153	MCT1 crossover cable (15-pin D-sub plug to RJ-48)	5-15
7154	MCT1 loopback cable (RJ-48 to RJ-48)	5-16
7155	MCT1 loopback cable (15-pin D-sub plug to 15-pin D-sub plug)	5-17
7156	MCT1 straight-through cable (RJ-48 to RJ-48)	5-18
7157	MCT1 straight-through cable (15-pin D-sub plug to 15-pin D-sub plug)	5-19
7158	15-pin synchronous plug to V.35 plug	6-18
7159	44-pin D-sub plug to V.35 plug	6-19
7160	MCE1 crossover cable (9-pin)	5-20
7161	MCE1 straight-through cable (9-pin)	5-21
7162	MCE1 cable, 75-ohm coaxial	5-22
7163	FDDI SC duplex to SC duplex connectors; multimode fiber cable; dual attachment to FDDI ring requires two cables	3-9
7164	FDDI SC duplex to bayonet (ST) connectors; single-mode fiber cable; dual attachment to FDDI ring requires two cables	3-8
7165	FDDI SC duplex to SC duplex connectors; single-mode fiber cable; dual attachment to FDDI ring requires two cables	3-9
7167	MCE1 DB9 to DB15 straight-through cable	5-23

(continued)

Table 1-2. Cables Listed by Order Number *(continued)*

Order No.	Physical Cable Description	Page
7168	MCE1 DB9 to DB15 crossover cable	5-24
7169	ATM cable, SC to ST MMF	3-10
7215	15-pin D-sub plug to V.35 plug (no DTR; for WAN connection)	6-21
7216	15-pin D-sub plug to V.35 plug (with DTR)	6-23
7218	RS-232-C synchronous pass-through (15-pin synchronous plug to RS-232-C plug; for DTE connection)	6-24
7219	V.35 synchronous pass-through (15-pin synchronous plug to V.35 plug; for DTE connection)	6-25
7220	44-pin D-sub plug to V.35 plug (leased line or V.25bis; for WAN connection)	6-27
7221	15-pin D-sub plug to X.21 plug (for WAN connection)	6-29
7224	44-pin D-sub plug to X.21 plug (for WAN connection)	6-30
7255	15-pin D-sub plug to RS-232-C plug (for WAN connection)	6-31
7256	15-pin D-sub plug to V.28 plug (for WAN connection)	6-32
7260	15-pin to 15-pin synchronous crossover (for back-to-back node operation)	6-33
7315	15-pin D-sub plug to RS-422 plug (for WAN connection)	6-35
7318	44-pin D-sub plug to RS-422 plug (leased line or V.25bis; for WAN connection)	6-37
7401	15-pin T1 framer plug (labeled DSX-1 or DSX-2) to 15-pin DTE plug (for CSU connection)	5-25
7415	15-pin T1 framer plug (labeled DSX-1 or DSX-2) to 15-pin customer premise equipment (CPE) plug	5-26
7525	25-pin D-sub plug to RS-232-C receptacle (for console interface to ASCII terminal connection)	2-3
7526	AFN/AN console cable; 9-pin D-sub plug to RS-232-C receptacle (for console interface to ASCII terminal connection)	2-4
7527	9-pin D-sub plug to RS-232-C receptacle (for console/modem connection to a console using a modem cable and a null-modem adapter)	2-5
7650	15-position CSU network receptacle to RJ-45 (for T-carrier line connection)	5-27
7750	15-position CSU network receptacle to spade terminals (for T-carrier line connection)	5-28
7825	9-pin D-sub plug to RS-232-C modem plug (for console/modem interface to dial modem connection)	2-6
7826	44-pin D-sub plug to RS-232-C plug (leased line or V.25bis; for WAN connection)	6-39

(continued)

Table 1-2. Cables Listed by Order Number *(continued)*

Order No.	Physical Cable Description	Page
7830	HSSI DCE plug to DTE plug (10 ft)	4-3
7831	HSSI DCE plug to DTE plug (50 ft)	4-3
7832	HSSI crossover cable; HSSI plug to HSSI plug	4-5
7833	RS-232-C synchronous pass-through (44-pin plug to RS-232-C plug)	6-40
7834	V.35 synchronous pass-through (44-pin plug to V.35 plug)	6-41
7835	V.35 crossover cable (44-pin plug to 44-pin plug)	6-43
7836	V.35 crossover cable (44-pin plug to 15-pin plug)	6-45
7837	44-pin to V.28 plug (for WAN connection)	6-47
7932	50-pin to V.35 plug	6-49
7933	50-pin to V.35 with raise DTR	7-17
7934	50-pin to RS-232	6-51
7935	50-pin to RS-232-C with raise DTR	7-19
7936	50-pin to X.21	6-52
7937	50-pin to RS-422	6-53
7938	50-pin to 50-pin crossover	6-55
7939	50-pin to 15-pin crossover	6-57
7940	50-pin to 44-pin crossover	6-59
7941	15-pin to female RS-232-C synchronous pass-through	6-61
7942	15-pin to female V.35 synchronous pass-through	6-62
7943	44-pin to female RS-232-C synchronous pass-through	6-63
7944	44-pin to female V.35 synchronous pass-through	6-64
7945	50-pin to female RS-232-C synchronous pass-through	6-66
7946	50-pin to female V.35 synchronous pass-through	6-67
7947	50-pin to 44-pin cable adapter	8-11
7948	50-pin to 15-pin V.35 cable adapter	8-14
77850	25-pin D-sub plug to RS-232-C modem plug (for BLN/BCN console/modem interface to dial modem connection)	2-7

New Synchronous Cable Cross Reference

Table 1-3 provides the information you need to cross reference the older legacy cables with the new fully functional synchronous cables. The new cables provide better coverage for all functions and interfaces. Use the order number of the old cable to cross reference to the order number of the new cable. This ensures that the function you need will be preserved.

Table 1-3. New Cable to Old Cable Cross Reference

Cable Description	New Cable Part Number	New Cable Order Number	Old Cable Part Number	Old Cable Order Number
44-pin plug to F RS-232-C DCE	311128-A	AA0018041	110778-B	7943
44-pin plug to F RS-422 DCE	311129-A	AA0018042	Not available	Not available
44-pin plug to F RS-530 DCE	311130-A	AA0018043	Not available	Not available
44-pin plug to F V.28 DCE	311131-A	AA0018044	Not available	Not available
44-pin plug to F V.35 DCE	311132-A	AA0018045	110779-B	7944
44-pin plug to F X.21 DCE	311133-A	AA0018046	111440	AA0018004
44-pin to RS-232-C DTR	311134-A	AA0018047	108787-B	7138
44-pin to RS-232-C loop timing	311135-A	AA0018048	Not available	Not available
44-pin to RS-232-C standard	311137-A	AA0018049	106260-B	7826
44-pin to RS-422 DTR	311138-A	AA0018050	108785	7139
44-pin to RS-422 loop timing	311139-A	AA0018051	Not available	Not available
44-pin to RS-422 standard	311140-A	AA0018052	106262	7318
44-pin to RS-530 loop timing	311143-A	AA0018053	Not available	Not available
44-pin to RS-530 standard	311144-A	AA0018054	112263	AA0018012
44-pin to V.28 DTR	311145-A	AA0018055	Not available	Not available
44-pin to V.28 loop timing	311146-A	AA0018056	Not available	Not available
44-pin to V.28 standard	311147-A	AA0018057	106521-B	7837
44-pin to V.35 DTR	311148-A	AA0018058	108786-C	7137
44-pin to V.35 loop timing	311149-A	AA0018059	Not available	Not available
44-pin to V.35 standard	311150-A	AA0018060	106263-C	7220
44-pin to 44-pin crossover	311151-A	AA0018061	106520	7835
44-pin to X.21 loop timing	311152-A	AA0018062	Not available	Not available
44-pin to X.21 standard	311153-A	AA0018063	106261	7224

Note: The new cable descriptions accurately depict the functions supported by the cable. The old cable descriptions may not exactly match the descriptions of the new cables.

Cable Connector Basics

Before using this guide, you should be familiar with its terminology and the connector types Nortel Networks provides.

Connector Terminology

This guide uses several terms to describe generically the various types of connectors and their physical/electrical attributes. Table 1-4 lists these terms and their definitions.

Table 1-4. Connector Terms

Term	Description
Pins	These are the short, rigid, lead wires protruding from a plug-type connector. The pins of a plug connector penetrate and make electrical contact with counterpart sockets, or holes, in a receptacle-type connector.
Sockets	These are the holes in a receptacle-type connector. Each hole: • Accepts one counterpart pin of a plug-type connector • Completes an electrical connection to its counterpart pin
Plug	This type of connector provides a number of pins and attaches to a receptacle-type connector.
Receptacle	This type of connector provides a number of sockets, or holes, that accept the pins of a plug-type connector.
Physical interface	This is a plug- or receptacle-type connector located on the router hardware platform or on a device such as an Ethernet transceiver. The physical interface accepts an appropriate (counterpart) cable connector.
Termination	This is the connector at one end of a cable; a termination can be either a plug- or receptacle-type connector.

Connector Types

Nortel Networks provides the following connector types:

- Attachment unit interface (AUI): A 15-pin D-type connector that connects equipment to the Ethernet network through a transceiver
- CCITT series (V.28, V.35): CCITT-recommended V.10 (unbalanced) and V.11 (balanced) standard connectors
- Data terminal equipment (DTE) to data communication equipment (DCE) interface (X.21): CCITT-recommended DTE to DCE synchronous/public switched network connector
- Fiber channel (FC): Threaded, straight-tip, coaxial or fiber optic connectors
- Fixed shroud duplex (FSD): Jack-type, dual fiber optic connector for use in FDDI networks
- Media access unit/multistation access unit (MAU): LAN wiring concentrator used in token ring networks
- Recommended standard (RS-232-C, RS-449/RS-422): EIA standard connectors for use with DTE and DCE devices
- Registered jack series (RJ-45; RJ-48): 8-position, FCC-registered data plugs
- Subscriber connector (SC) duplex: Jack-type, dual fiber optic connector for use in FDDI networks
- Spade terminals: Flat, U-shaped connectors typically used for T-carrier line connection
- Straight-tip (ST): Bayonet coaxial or fiber optic connectors

Note: Many types of fiber optic connectors include a dust cover. (Dust obstructs or attenuates optical signals entering or leaving the cable through the connector.) Be careful not to lose the dust cover when you attach a fiber optic cable connector to its counterpart connector. Replace dust covers when you detach a fiber optic cable from any local device.

Figure 1-1 shows a sample of connectors in cable assemblies for Nortel Networks router hardware platforms.

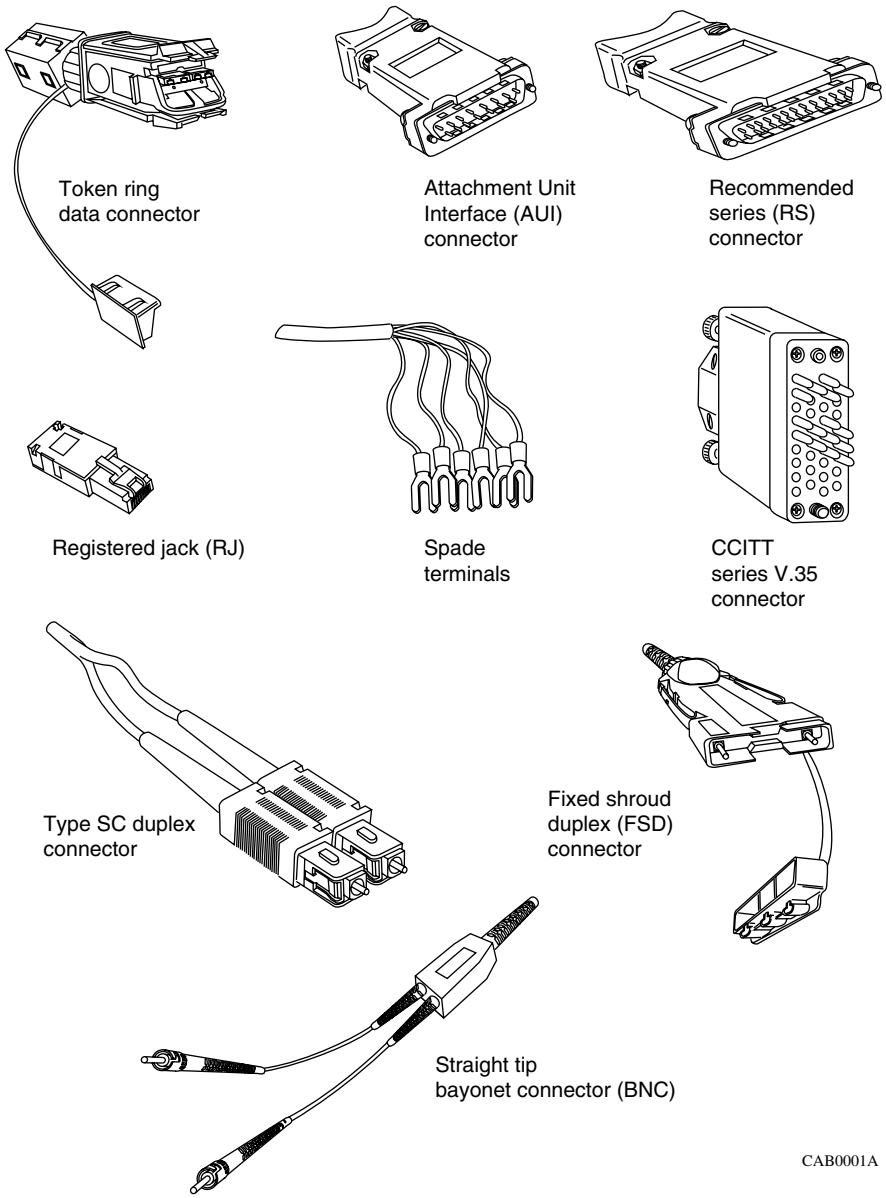


Figure 1-1. Connector Types

Building Your Own Cables

Cables that you build must comply with standard cable specifications and network requirements. Cable length, cable type, cable and connector attenuation, and other factors affect the overall performance and reliability of your network.

For example, using a cable length longer than that recommended in industry standards or interface specifications, or using a cable type that is unsuitable, considering the cable environment (temperature, electrical noise, radio-frequency [RF] emissions, and other factors) may degrade network performance and reliability.

For additional information about maximum cable length and other factors, consult the appropriate EIA, IEEE, CCITT, or ISO specification, standard, or recommendation. Some examples include:

- IEEE 802.3 10BASE-T Specification (10 Mb/s CSMA/CD over twisted pair)
- IEEE 802.5 Specification (token ring)
- X3T9.5 Single-Mode Fiber PMD Specification (FDDI)
- EIA RS-449/RS-422A Standard
- EIA RS-232-C Standard
- CCITT V.10/V.11/V.28/V.35 Recommendations
- CCITT X.21 Recommendation

See also the manufacturer's specifications for any cables or connectors you want to use. Specifications for attenuation per unit length of cable, and for connector insertion loss, are useful in helping you to determine the maximum amount of signal loss (and, therefore, the maximum distance) allowable between two directly connected network devices.

The physical interface on each device (for example, the connector on an Ethernet link module in a Nortel Networks router hardware platform) determines which industry specification, standard, or recommendation you need to consult for guidelines on how to customize your cables.

To assist you in determining which industry document you need to consult, the description for each cable in this guide includes an "Industry Interface Type" description.

Chapter 2
Console/Modem Cables

This chapter identifies the console/modem cables that link Nortel Networks router hardware platforms to DTE and DCE devices.

Table 2-1 summarizes the cables. Detailed cable illustrations and pinouts follow.

Table 2-1. Console/Modem Cables

Order No.	Length	Physical Cable Description	Connection	Page
7525	25 ft (7.63 m)	25-pin D-sub plug to RS-232-C receptacle	Console/modem interface to any ASCII terminal (for all devices except AFN®, AN®, Passport™ 2430, and Passport 5430 Fast Branch Router)	2-3
7526	25 ft (7.63 m)	AFN/AN console cable; 9-pin D-sub plug to RS-232-C receptacle	Console/modem interface to any ASCII terminal (for AFN and AN only)	2-4
7527	10 ft (3.05 m)	AT serial console cable; 9-pin D-sub plug to RS-232-C modem plug	Console/modem interface (kit contains a modem cable and a null-modem adapter) to a console	2-5
7825	25 ft (7.63 m)	9-pin D-sub plug to RS-232-C modem plug	Console/modem interface to a dial modem (for all devices except BLN®, BLN-2, and BCN®)	2-6
77850	15 ft (4.57 m)	25-pin D-sub plug to RS-232-C modem plug	Console/modem interface to a dial modem (for BLN, BLN-2, and BCN only)	2-7
AA0011026	10 ft (3.05 m)	9-pin D-sub plug to RJ-45	Console/modem interface to any PC (for Passport 2430 and Passport 5430 only)	2-8

If you need to order additional cables, contact the Nortel Networks Technical Solutions Center in your area. (See “How to Get Help” in the Preface.)

The following sections include:

- Cable illustrations with the Nortel Networks connector on the left and the remote connector on the right
- Cable length information

  If you want to build a cable, and you want to determine the maximum cable length appropriate for that interconnection requirement, you should:

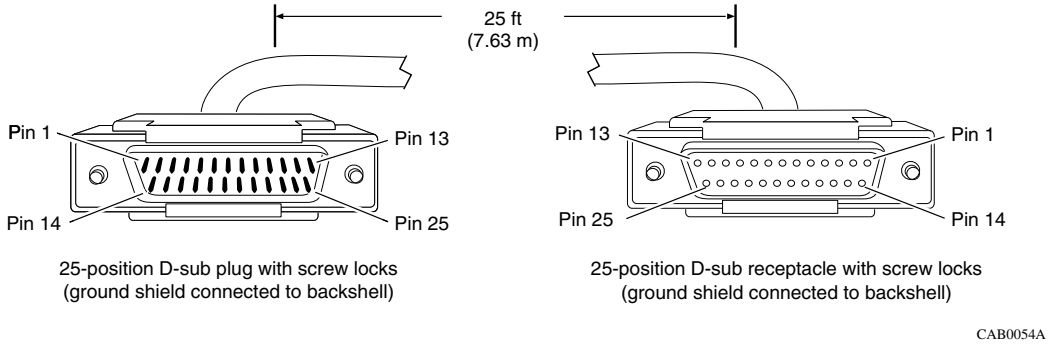
  -- Identify in this chapter a cable that satisfies your interconnection requirement (with the exception of total cable length).

  -- Consult the networking industry specification, standard, or recommendation designated in the "Industry Interface Type" entry for that cable (located immediately following the cable pinout diagram).
- Pinouts for each connector and all associated signals
- Internal wire connections for each termination (when applicable)

  For example, the console port to ASCII terminal cable (Order No. 7525) lists internal wire connections such as "Pin 6 > 20" in the Remote Termination column. This indicates that you must connect pin 6 to pin 20 inside the remote termination.
- Grounding arrangements that isolate the chassis from the DC ground within the cable (when applicable)

Console Interface to ASCII Terminal (Order No. 7525)

Caution: Do not use this cable to attach a modem to any Nortel Networks router hardware platform. Use this cable only to attach an ASCII terminal to any Nortel Networks router hardware platform except a model AN or AFN.

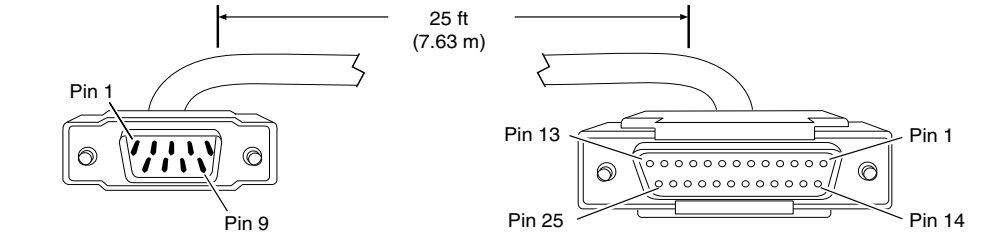


Industry Interface Type: RS-232-C

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Transmit Data	2	3	Receive Data
Receive Data	3	2	Transmit Data
Request to Send	4	5	Clear to Send
Clear to Send	5	4	Request to Send
Signal Ground	7	7	Signal Ground
Internal Wire Connections			
		Pin 6 > 20	

AFN/AN Console Interface to ASCII Terminal (Order No. 7526)

Caution: Do not use this cable to attach a modem to any Nortel Networks router hardware platform. Use this cable only to attach an ASCII terminal to a Nortel Networks model AN or AFN platform.



9-position D-sub plug with screw locks
(ground shield connected to backshell)

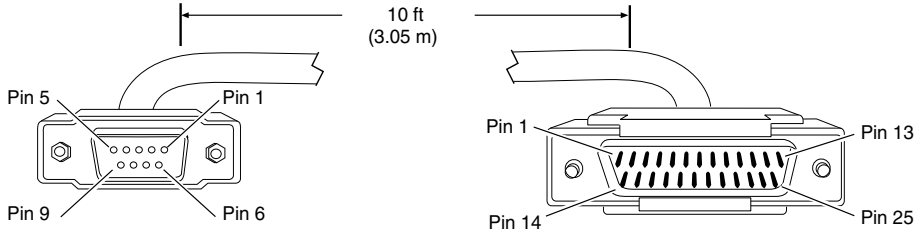
25-position D-sub receptacle with screw locks
(ground shield connected to backshell)

CAB0055A

Industry Interface Type: RS-232-C

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Transmit Data	2	3	Receive Data
Receive Data	3	2	Transmit Data
Request to Send	4	5	Clear to Send
Clear to Send	5	4	Request to Send
Signal Ground	7	7	Signal Ground
Internal Wire Connections			
		Pin 6 > 8 > 20	

AT Serial Console (Order No. 7527)



9-position D-sub receptacle with screw locks
(ground shield connected to backshell)

25-position D-sub plug with screw locks
(ground shield connected to backshell)

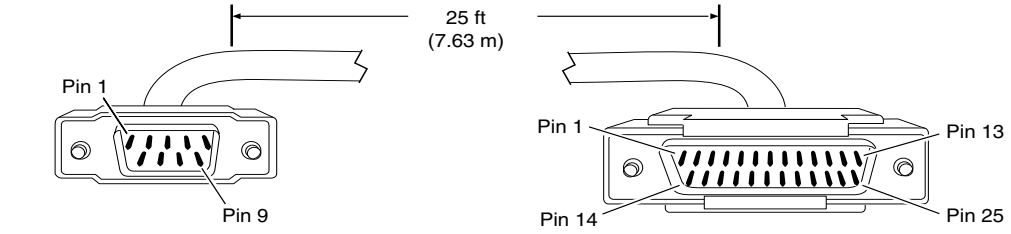
CAB0056A

Industry Interface Type: RS-232-C

Nortel Networks Termination		**Modem Termination**	
Signal	**Pin # to Pin #**		**Signal**
Data Carrier Detect	1	8	Data Carrier Detect
Transmit Data (TXD)	2	2	Transmit Data (TXD)
Receive Data (RXD)	3	3	Receive Data (RXD)
Data Set Ready	4	6	Data Set Ready
Data Terminal Ready	6	20	Data Terminal Ready
Clear to Send	7	5	Clear to Send
Request to Send	8	4	Request to Send

Console/Modem Interface to RS-232-C Modem (Order No. 7825)

Caution: This is a modem cable. Do not use this cable to attach an ASCII terminal to a Nortel Networks router hardware platform. Use this cable to attach a modem to any Nortel Networks router hardware platform except a model BLN®, BLN-2, or BCN®.



9-position D-sub plug with screw locks
(ground shield connected to backshell)

25-position D-sub plug with screw locks
(ground shield connected to backshell)

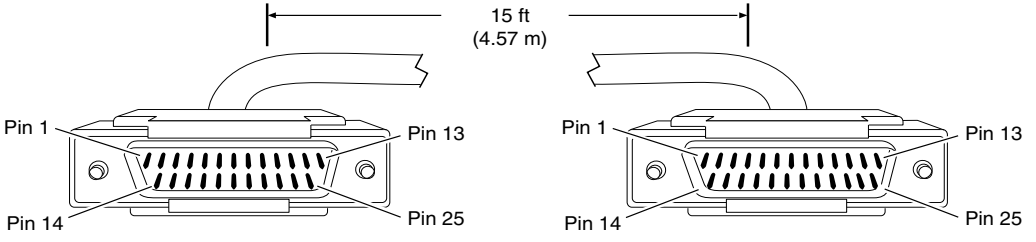
CAB0060A

Industry Interface Type: RS-232-C

Nortel Networks Termination		Modem Termination	
Signal	**Pin # to Pin #**		**Signal**
Transmit Data	2	2	Transmit Data
Receive Data	3	3	Receive Data
Request to Send	4	4	Request to Send
Clear to Send	5	5	Clear to Send
Data Set Ready	6	6	Data Set Ready
Signal Ground	7	7	Signal Ground
Carrier Detect	8	8	Carrier Detect
Data Terminal Ready	9	20	Data Terminal Ready

Backbone Console Interface to RS-232-C Modem (Order No. 77850)

Caution: This is a modem cable. Do not use this cable to attach an ASCII terminal to a Nortel Networks router hardware platform. Use this cable only to attach a modem to a Nortel Networks model BLN, BLN-2, or BCN platform.



25-position D-sub plug with screw locks (ground shield connected to backshell)

25-position D-sub plug with screw locks (ground shield connected to backshell)

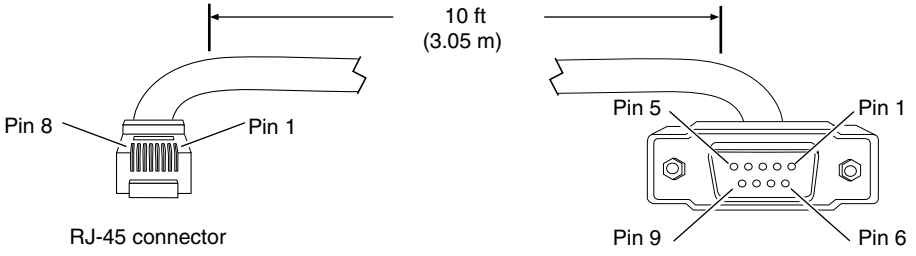
CAB0061A

Industry Interface Type: RS-232-C

Nortel Networks Termination		**Modem Termination**	
Signal	**Pin # to Pin #**		**Signal**
Chassis Ground	1	1	Chassis Ground
Transmit Data	2	2	Transmit Data
Receive Data	3	3	Receive Data
Request to Send	4	4	Request to Send
Clear to Send	5	5	Clear to Send
Data Set Ready	6	6	Data Set Ready
Signal Ground	7	7	Signal Ground
Data Carrier Detect	8	8	Data Carrier Detect
Data Terminal Ready	20	20	Data Terminal Ready

Passport 2430 and Passport 5430 Fast Branch Router Console Interface to PC (Order No. AA0011026)

Caution: Do not use this cable to attach a modem to any Nortel Networks router hardware platform. Use this cable only to attach a PC to a Nortel Networks model Passport 2430 or Passport 5430 Fast Branch Router platform.



CAB0110A

Industry Interface Type: RS-232-D

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Clear to Send	1	8	Clear to Send
Data Set Ready	2	6	Data Set Ready
Receive Data	3	3	Send Data
Data Carrier Detect	4	1	Data Carrier Detect
Send Data	5	2	Receive Data
Signal Ground	6	5	Signal Ground
Data Terminal Ready	7	4	Data Terminal Ready
Request to Send	8	7	Request to Send

Chapter 3
LAN Cables

This chapter identifies the local area network (LAN) cables that link Nortel Networks router hardware platforms to other LAN devices.

Table 3-1 summarizes the cables. Detailed cable illustrations and pinouts follow.

Table 3-1. Local Area Network Cables

Order No.	Length	Physical Cable Description	Connection	Page
7115	15 ft (4.57 m)	15-pin AUI plug to 15-position AUI receptacle	Nortel Networks Ethernet/802.3 XCVR interface to an Ethernet AUI network connection	3-3
7125	15 ft (4.57 m)	9-pin D-sub plug to token ring/ 802.5 MAU data connector; STP cable	Nortel Networks token ring/802.5 MAU interface to a token ring network connection	3-4
7126	15 ft (4.57 m)	9-pin D-sub plug to token ring/ 802.5 MAU data connector with ferrite bead; STP cable	Nortel Networks token ring/802.5 MAU interface to a token ring network connection	3-5
7128	1 ft (0.3 m)	9-pin D-sub plug to RJ-11 receptacle	Nortel Networks token ring/802.5 MAU interface to a token ring network connection	3-6
7135	32.81 ft (10 m)	FSD to FSD connectors; dual attachment to FDDI ring requires two cables	Nortel Networks PHY A or PHY B interface to an FDDI FSD network connection	3-7
7136	32.81 ft (10 m)	FSD to ST connectors; dual attachment to FDDI ring requires two cables	Nortel Networks PHY A or PHY B interface to a bayonet-type FDDI network connection	3-7

(continued)

Table 3-1. Local Area Network Cables *(continued)*

Order No.	Length	Physical Cable Description	Connection	Page
7164	9 ft (2.7 m)	FDDI SC duplex to bayonet (ST) connectors; single-mode fiber cable; dual attachment to FDDI ring requires two cables	Nortel Networks PHY A or PHY B interface to a type ST FDDI network connection	3-8
7163	9 ft (2.7 m)	FDDI SC duplex to SC duplex connectors; multimode fiber cable; dual attachment to FDDI ring requires two cables	Nortel Networks PHY A or PHY B interface to a type SC FDDI network connection	3-9
7165	9 ft (2.7 m)	FDDI SC duplex to SC duplex connectors; single-mode fiber cable; dual attachment to FDDI ring requires two cables	Nortel Networks PHY A or PHY B interface to a type SC FDDI network connection	3-9
7169	9 ft (2.7 m)	ATM SC duplex to bayonet (ST) connectors; multimode fiber cable; dual attachment to FDDI ring requires two cables	Nortel Networks PHY A or PHY B interface to a type ST FDDI network connection	3-10

If you need to order additional cables, contact the Nortel Networks Technical Solutions Center in your area. (See “How to Get Help” in the Preface.) The following sections include:

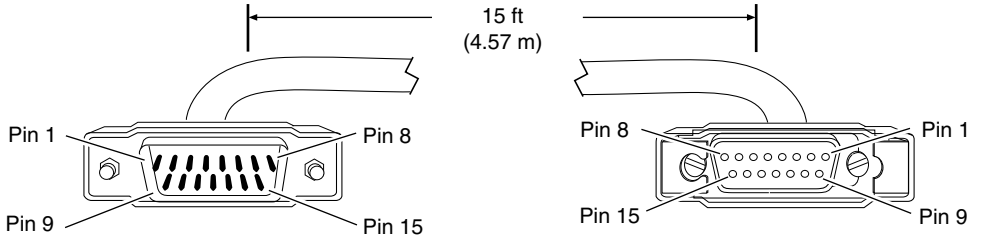
- Cable illustrations with the Nortel Networks connector on the left and the remote connector on the right
- Cable length information

  If you want to build a cable, and you want to determine the maximum cable length appropriate for that interconnection requirement, you should:

  -- Identify in this chapter a cable that satisfies your interconnection requirement (with the exception of total cable length).

  -- Consult the networking industry specification, standard, or recommendation designated in the “Industry Interface Type” entry for that cable (located immediately following the cable pinout diagram).
- Pinouts for each connector and all associated signals (except for the FDDI cables, which have no wire connections)
- Grounding arrangements that isolate the chassis of an attached device from the DC ground within the cable (when applicable)

Ethernet Cable (Order No. 7115)



15-position D-sub plug with locking posts (ground shield connected to backshell)

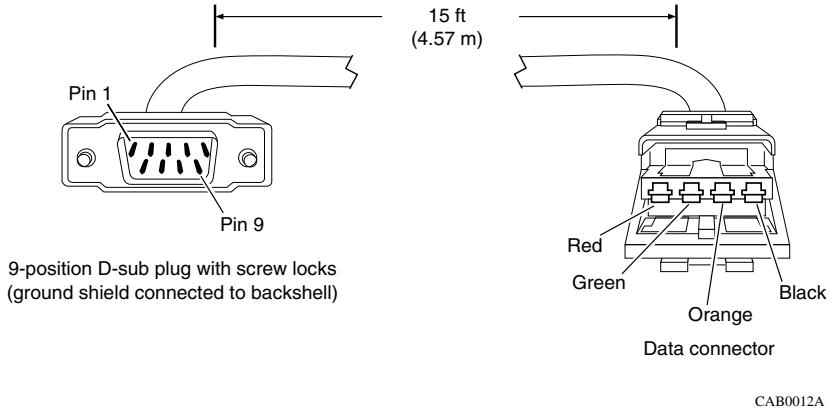
15-position D-sub receptacle with slide latch connected to backshell

CAB0002A

Industry Interface Type: Ethernet/802.3

Nortel Networks Termination		**Transceiver Termination**	
Signal	**Pin # to Pin #**		**Signal**
Collision +	2	2	Collision + (802.3 Circuit CI-A)
Transmit +	3	3	Transmit + (802.3 Circuit DO-A)
Receive +	5	5	Receive + (802.3 Circuit DI-A)
Voltage Common	6	6	Voltage Common (802.3 Circuit VC)
Collision -	9	9	Collision - (802.3 Circuit CI-B)
Transmit -	10	10	Transmit - (802.3 Circuit DO-B)
Receive -	12	12	Receive - (802.3 Circuit DI-B)
+12 V	13	13	+12 V (802.3 Circuit VP)

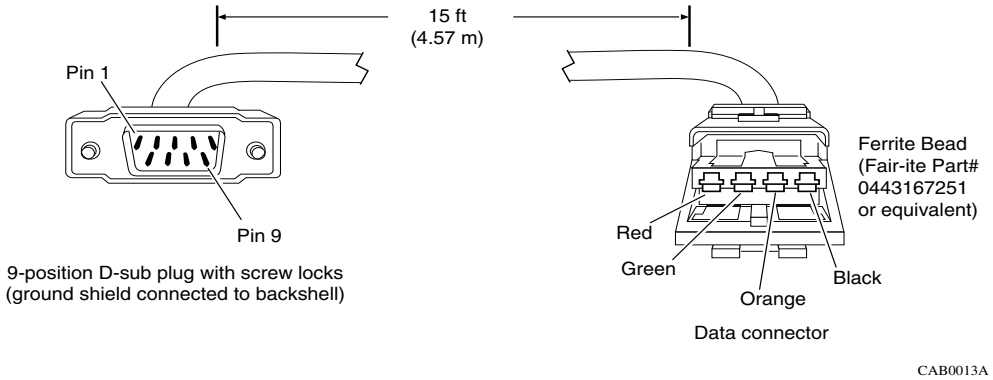
Token Ring MAU Cable (Order No. 7125)



Industry Interface Type: Token Ring/802.5

Nortel Networks Termination		**Token Ring MAU**
Signal	**Pin #**	**Contact (by Wire Color)**
Receive A	1	Red
Transmit A	5	Black
Receive B	6	Green
Transmit B	9	Orange

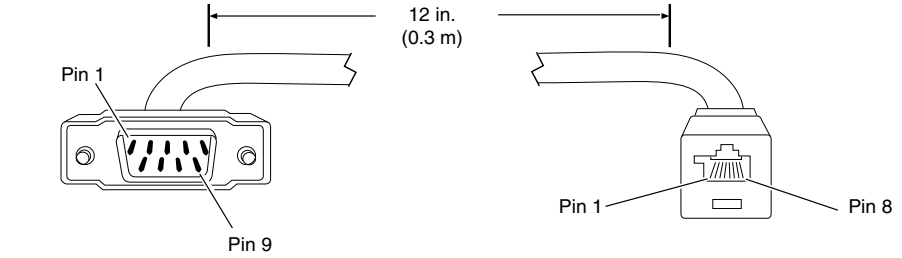
Token Ring MAU Cable with Ferrite Bead (Order No. 7126)



Industry Interface Type: Token Ring/802.5

Nortel Networks Termination		**Token Ring MAU**
Signal	**Pin #**	**Contact (by Wire Color)**
Receive A	1	Red
Transmit A	5	Black
Receive B	6	Green
Transmit B	9	Orange

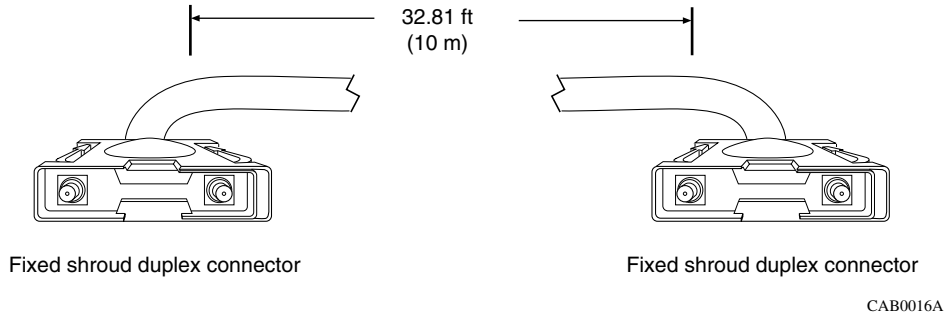
Token Ring to RJ-11 Cable (Order No. 7128)



Industry Interface Type: Token Ring/802.5

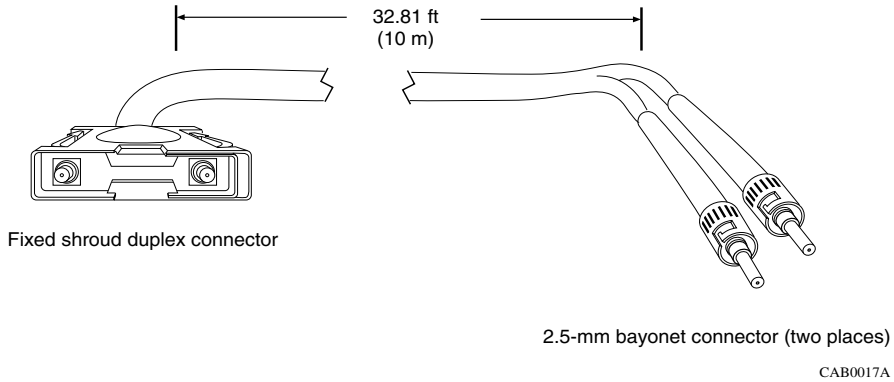
Nortel Networks Termination		**RJ-11 Receptacle**	
Signal	**Pin # to Pin #**		**Signal**
Receive A	1	4	Receive Data +
Transmit A	5	3	Transmit Data +
Receive B	6	5	Receive Data -
Transmit B	9	6	Transmit Data -

FDDI FSD to FSD (Order No. 7135)



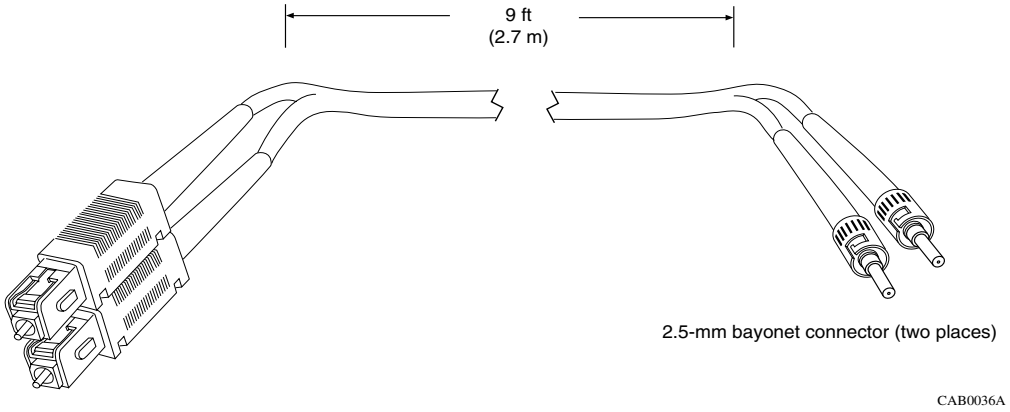
Industry Interface Type: X3T9.5 PMD/FDDI

FDDI FSD to Straight Tip (Order No. 7136)



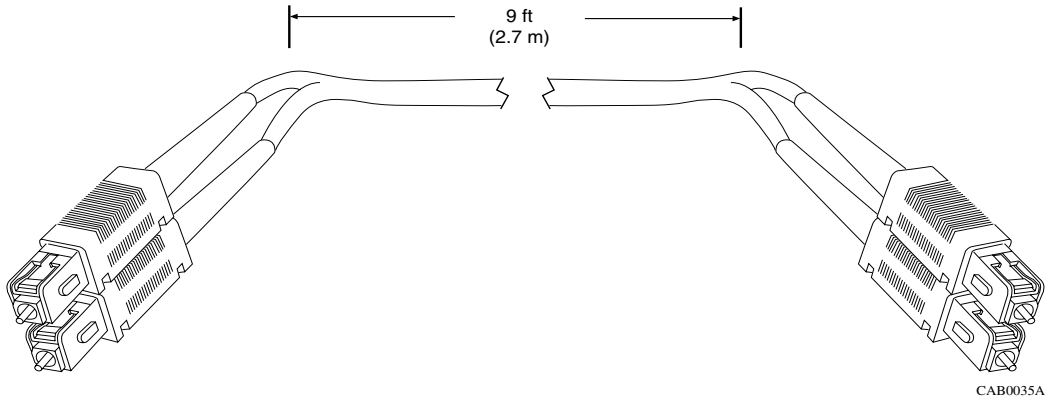
Industry Interface Type: X3T9.5 PMD/FDDI

FDDI-Type SC Duplex to Straight Tip (Order No. 7164 for Single-Mode Cable)



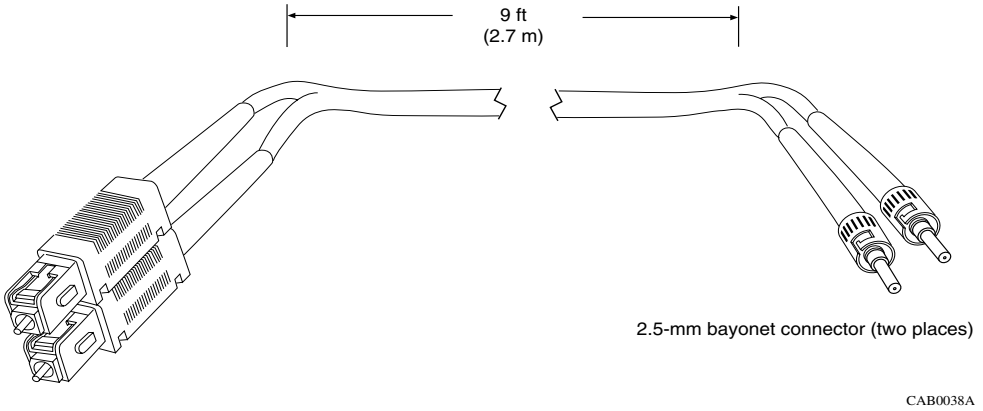
Industry Interface Type: X3T9.5 PMD/FDDI

FDDI-Type SC Duplex to SC Duplex (Order No. 7163 for Multimode Cable) (Order No. 7165 for Single-Mode Cable)



Industry Interface Type: X3T9.5 PMD/FDDI

ATM Cable, SC to Straight Tip MMF (Order No. 7169)



Industry Interface Type: X3T9.5 PMD/FDDI

Chapter 4
HSSI Cables

This chapter identifies the High Speed Serial Interface (HSSI) cables that link Nortel Networks router hardware platforms to LAN and WAN devices.

Table 4-1 summarizes the cables. Detailed cable illustrations and pinouts follow.

Table 4-1. HSSI Cables

Order No.	Length	Physical Cable Description	Page
7830	10 ft (3.05 m)	HSSI DCE plug to DTE plug	4-3
7831	50 ft (15.24 m)	HSSI DCE plug to DTE plug	4-3
7832	20 ft (6.10 m)	HSSI crossover; HSSI plug to HSSI plug (This cable is intended for test environments only.)	4-5

If you need to order additional cables, contact the Nortel Networks Technical Solutions Center in your area. (See “How to Get Help” in the Preface.)

The following sections include:

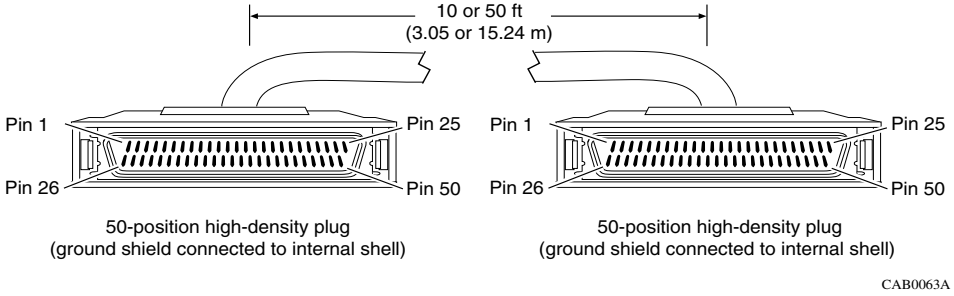
- Cable illustrations with the Nortel Networks connector on the left and the remote connector on the right
- Cable length information

  If you want to build your own cables, and you want to determine the maximum cable length appropriate for each of your interconnection requirements, you should:

  -- Identify in this chapter a cable that satisfies your wiring requirement (with the exception of total cable length).

  -- Consult the HSSI specification for cable length data.
- Pinouts for each connector and all associated signals
- Grounding arrangements that isolate the chassis from the DC ground within the cable

HSSI DCE to DTE
(10 Ft: Order No. 7830; 50 Ft: Order No. 7831)



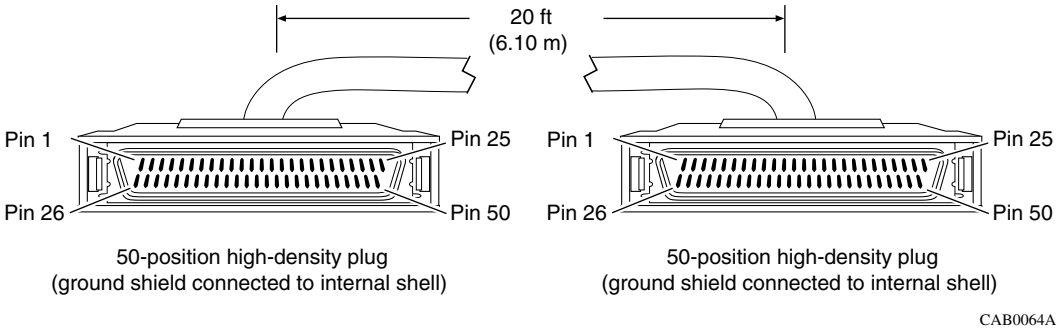
Industry Interface Type: High-Speed Serial Interface (HSSI)

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Signal Ground	1	1	Signal Ground
Signal Ground	26	26	Signal Ground
Receive Timing +	2	2	Receive Timing +
Receive Timing -	27	27	Receive Timing -
DCE Available +	3	3	DCE Available +
DCE Available -	28	28	DCE Available -
Received Data +	4	4	Received Data +
Received Data -	29	29	Received Data -
Send Timing +	6	6	Send Timing +
Send Timing -	31	31	Send Timing -
Signal Ground	7	7	Signal Ground
Signal Ground	32	32	Signal Ground
DTE Available +	8	8	DTE Available +

(continued)

Nortel Networks Termination		Remote Termination	
Signal	**Pin # to Pin #**		**Signal**
DTE Available -	33	33	DTE Available -
Terminal Timing +	9	9	Terminal Timing +
Terminal Timing -	34	34	Terminal Timing -
Loopback CKT A +	10	10	Loopback CKT A +
Loopback CKT A -	35	35	Loopback CKT A -
Send Data +	11	11	Send Data +
Send Data -	36	36	Send Data -
Loopback CKT B +	12	12	Loopback CKT B +
Loopback CKT B -	37	37	Loopback CKT B -
Signal Ground	13	13	Signal Ground
Signal Ground	38	38	Signal Ground
Signal	14	14	Signal
Signal Ground	19	19	Signal Ground
Signal Ground	44	44	Signal Ground
Signal Ground	25	25	Signal Ground
Signal Ground	50	50	Signal Ground

HSSI Crossover (Order No. 7832)



Industry Interface Type: High-Speed Serial Interface (HSSI)

This cable is intended solely for test environments; you cannot use it in production applications.Within such test environments, this cable provides a proprietary, nonstandard, back-to-back connection of Nortel Networks router hardware platforms (through their HSSI ports) without intervening digital service unit (DSU) equipment.

When using the Nortel Networks HSSI crossover cable, you must set the HSSI interfaces to clock internally. The data rate under internal clocking conditions must not exceed 25 megabits per second (Mb/s). (HSSI operation in a production environment allows for a DSU configuration from 300 Kb/s to 52 Mb/s.)

For additional information about enabling internal clocking, refer to *Using Technician Interface Software* (router software) or *Administration Guide* (BayStream™ software).

Nortel Networks Termination A		Nortel Networks Termination B	
Signal	**Pin # to Pin #**		**Signal**
Signal Ground	1	1	Signal Ground
Signal Ground	26	26	Signal Ground
Receive Timing +	2	9	Terminal Timing +
Receive Timing -	27	34	Terminal Timing -
DCE Available +	3	8	DTE Available +
DCE Available -	28	33	DTE Available -
Receive Data +	4	11	Send Data +
Receive Data -	29	36	Send Data -
Signal Ground	7	7	Signal Ground
Signal Ground	32	32	Signal Ground
DTE Available +	8	3	DCE Available +
DTE Available -	33	28	DCE Available -
Terminal Timing +	9	2	Receive Timing +
Terminal Timing -	34	27	Receive Timing -
Send Data +	11	4	Receive Data +
Send Data -	36	29	Receive Data -
Signal Ground	13	13	Signal Ground
Signal Ground	38	38	Signal Ground
Signal Ground	19	19	Signal Ground
Signal Ground	44	44	Signal Ground
Signal Ground	25	25	Signal Ground
Signal Ground	50	50	Signal Ground

Chapter 5
E1/T1 Cables

This chapter identifies the cables that interconnect a T1 framer or MCT1 link module with a channel service unit (CSU) or T1 digital signal cross-connect switch (DSX-1 or DSX-2), an E1/T1 line, or an external T1 clock source.

Table 5-1 summarizes the cables. Detailed cable illustrations and pinout specifications follow.

Table 5-1. E1/T1 Cables

Order No.	Length	Physical Cable Description	Page
AA0018001	10 ft (3.05 m)	MCE1 DB9 to mod jack cable; 9-pin to RJ-45	5-4
AA0018002	10 ft (3.05 m)	MCE1 DB9 to unterminated end cable; 9-pin to unterminated end	5-5
AA0018006	6 in (0.15 m)	Quad MCT1 clock cable (15-pin D-sub plug and 9-position D-sub receptacle to 15-pin D-sub receptacle)	5-6
AA0018014	10 ft (3.05 m)	MCE1 RJ-45 to RJ-45 cable	5-7
AA0018015	10 ft (3.05 m)	MCE1 RJ-45 to unterminated end cable	5-8
AA0018021	15 ft (4.57 m)	Quad MCT1 crossover cable (15-pin D-sub plug to 15-pin D-sub plug)	5-9
AA0018022	15 ft (4.57 m)	Quad MCT1 straight-through cable (15-pin D-sub plug to 15-pin D-sub plug)	5-10
AA0018040	1 ft (.30 m)	ATM E1 RJ-45 to RJ-45 cable (for use with the AA0018040 Balun, described in Chapter 8)	5-11
7150	15 ft (4.57 m)	MCT1 clock cable; 9-pin D-sub plug to 15-pin D-sub plug	5-12
7151	N/A	MCT1 loopback connector; 15-pin D-sub plug	5-13
7152	N/A	MCT1 loopback connector, RJ-48	5-14
7153	15 ft (4.57 m)	MCT1 crossover cable; 15-pin D-sub plug to RJ-48	5-15

(continued)

Table 5-1. E1/T1 Cables *(continued)*

Order No.	Length	Physical Cable Description	Page
7154	15 ft (4.57 m)	MCT1 loopback cable; RJ-48 to RJ-48	5-16
7155	15 ft (4.57 m)	MCT1 loopback cable; 15-pin D-sub plug to 15-pin D-sub plug	5-17
7156	15 ft (4.57 m)	MCT1 straight-through cable; RJ-48 to RJ-48	5-18
7157	15 ft (4.57 m)	MCT1 straight-through cable; 15-pin D-sub plug to 15-pin D-sub plug	5-19
7160	10 ft (3.05 m)	MCE1 DB9 to DB9 crossover cable	5-20
7161	10 ft (3.05 m)	MCE1 DB9 to DB9 straight-through cable	5-21
7162	10 ft (3.05 m)	MCE1 coaxial cable, 75-ohm coaxial	5-22
7167	10 ft (3.05 m)	MCE1 DB9 to DB15 straight-through cable	5-23
7168	10 ft (3.05 m)	MCE1 DB9 to DB15 crossover cable	5-24
7401	1 ft (0.3 m)	15-pin T1 framer plug (labeled DSX-1 or DSX-2) to 15-pin DTE plug (for CSU connection)	5-25
7415	15 ft (4.57 m)	15-pin T1 framer plug (labeled DSX-1 or DSX-2) to 15-pin external customer premise equipment (CPE) plug	5-26
7650	50 ft (15.24 m)	15-position CSU network receptacle to RJ-45 (for T-carrier line connection)	5-27
7750	50 ft (15.24 m)	15-position CSU network receptacle to spade terminals (for T-carrier line connection)	5-28

If you need to order additional cables, contact the Nortel Networks Technical Solutions Center in your area. (See “How to Get Help” in the Preface.)

The following sections include:

- Cable illustrations with the Nortel Networks connector on the left and the remote connector on the right
- Cable length information

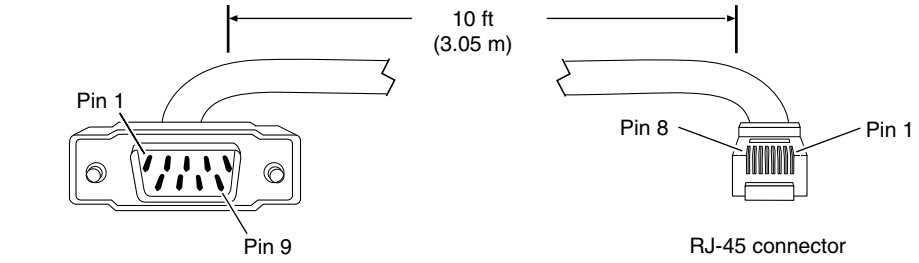
  If you want to build a cable, and you want to determine the maximum cable length appropriate for each of your interconnection requirements, you should:

  -- Identify in this chapter a cable that satisfies your wiring requirement (with the exception of total cable length).

  -- Consult the networking industry specification, standard, or recommendation designated in the “Industry Interface Type” entry for that cable (located immediately following the cable pinout diagram).
- Pinouts for each connector and all associated signals
- Grounding arrangements that isolate the chassis from the DC ground within the cable

MCE1 DB9 to Mod Jack Cable (Order No. AA0018001)

Note: This cable assembly uses a 120-ohm wire.

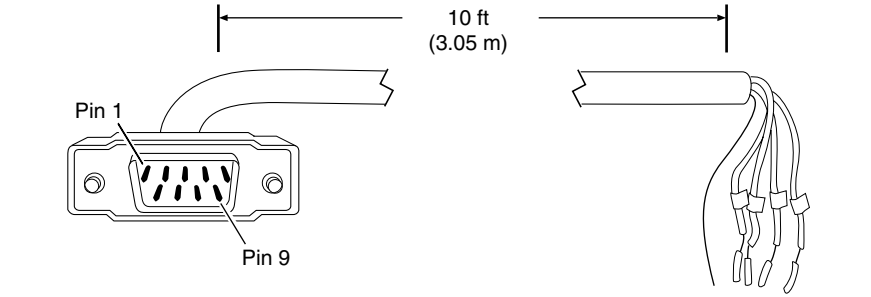


Industry Interface Type: E1

Nortel Networks Termination		Remote Termination	
Signal	**Pin # to Pin #**		**Signal**
Receive Tip	1	1	Receive Tip
Receive Ring	6	2	Receive Ring
Transmit Tip	5	4	Transmit Tip
Transmit Ring	9	5	Transmit Ring
Ground	3	3	Ground

MCE1 DB9 to Unterminated Cable (Order No. AA0018002)

Note: This cable assembly uses a 120-ohm wire.

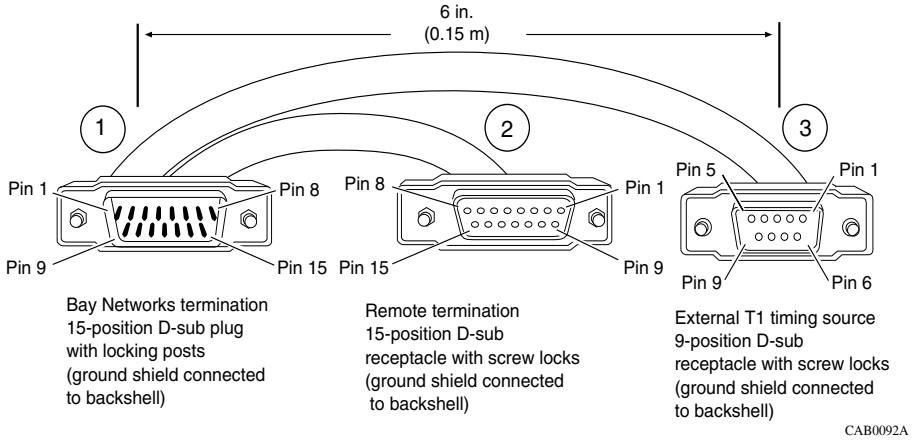


Industry Interface Type: E1

Nortel Networks Termination		Remote Termination	
Signal	**Pin # to Wire Color**		**Signal**
Receive Tip	1	White/ Blue	Receive Tip
Receive Ring	6	Blue/ White	Receive Ring
Transmit Tip	5	White/ Orange	Transmit Tip
Transmit Ring	9	Orange/ White	Transmit Ring
Ground	3	Bare	Ground

Quad MCT1 Clock Cable (Order No. AA0018006)

Note: You can use this cable assembly with COM 1 ports only.



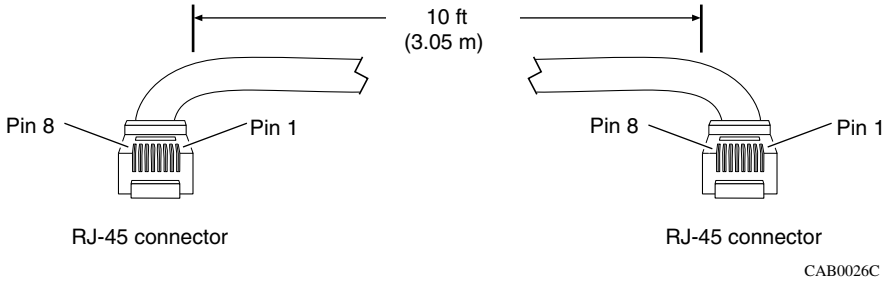
Industry Interface Type: T1/DS1 with External Clock (Input from an External T1 Timing Source)

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Transmit Tip	1-1	2-1	Transmit Tip
Transmit Ring	1-9	2-9	Transmit Ring
Receive Tip	1-3	2-3	Receive Tip
Receive Ring	1-11	2-11	Receive Ring
EXT Tip	1-7	3-2	EXT Tip
EXT Ring	1-15	3-3	EXT Ring
Ground	1-2	1-4	Ground*
Ground	2-2	2-4	Ground*

* You must configure onboard jumpers to complete this connection. Refer to the table called “QMCT1 Link Module Settings” in *Installing T1 Link Modules in BN Platforms*.

MCE1 RJ-45 to RJ-45 Cable (Order No. AA0018014)

Note: This cable assembly uses a 120-ohm wire.

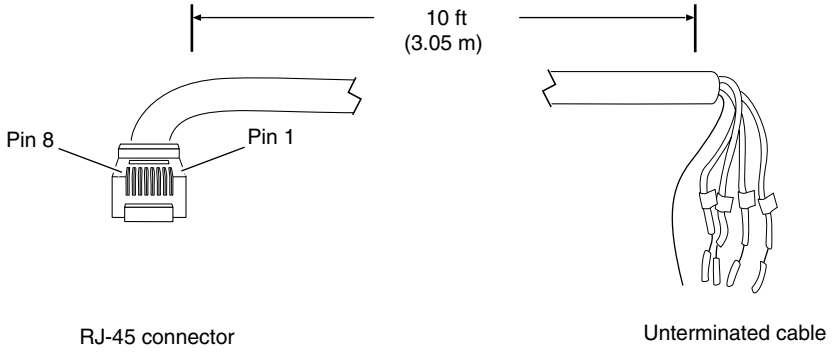


Industry Interface Type: E1

Nortel Networks Termination		Remote Termination	
Signal	**Pin # to Pin #**		**Signal**
Receive Tip	1	1	Receive Tip
Receive Ring	2	2	Receive Ring
Transmit Tip	4	4	Transmit Tip
Transmit Ring	5	5	Transmit Ring

MCE1 RJ-45 to Unterminated Cable (Order No. AA0018015)

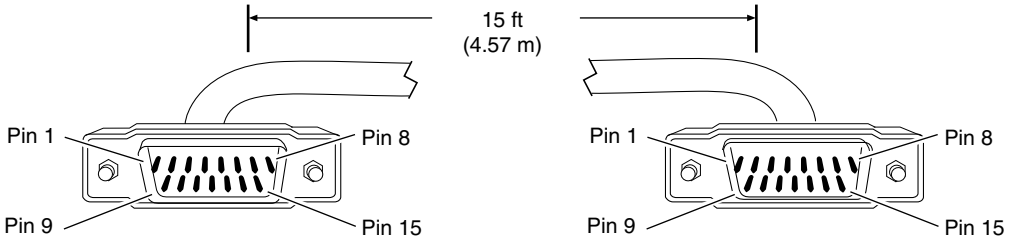
Note: This cable assembly uses a 120-ohm wire.



Industry Interface Type: E1

Nortel Networks Termination		
Signal	**Pin #**	**Signal**
Receive Tip	1	Receive Tip
Receive Ring	2	Receive Ring
Transmit Tip	4	Transmit Tip
Transmit Ring	5	Transmit Ring

Quad MCT1 15-Pin to 15-Pin Crossover Cable (Order No. AA0018021)



15-position D-sub plug with locking posts (ground shield connected to backshell)

15-position D-sub plug with locking posts (ground shield connected to backshell)

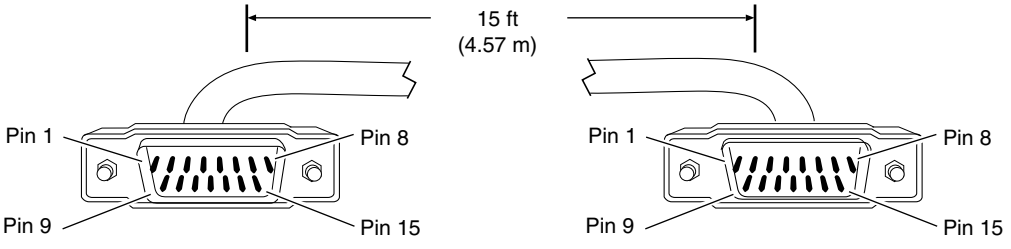
CAB0098A

Industry Interface Type: T1/DS1

Nortel Networks Termination A		**Nortel Networks Termination B**	
Signal	**Pin # to Pin #**		**Signal**
Transmit Tip	1	3	Receive Tip
Transmit Ring	9	11	Receive Ring
Receive Tip	3	1	Transmit Tip
Receive Ring	11	9	Transmit Ring
Ground	2	4	Ground*
Ground	2	4	Ground*

* You must configure onboard jumpers to complete this connection. Refer to the table called “QMCT1 Link Module Settings” in *Installing T1 Link Modules in BN Platforms*.

Quad MCT1 15-Pin to 15-Pin Straight-Through Cable (Order No. AA0018022)



15-position D-sub plug with locking posts (ground shield connected to backshell)

15-position D-sub plug with locking posts (ground shield connected to backshell)

CAB0099A

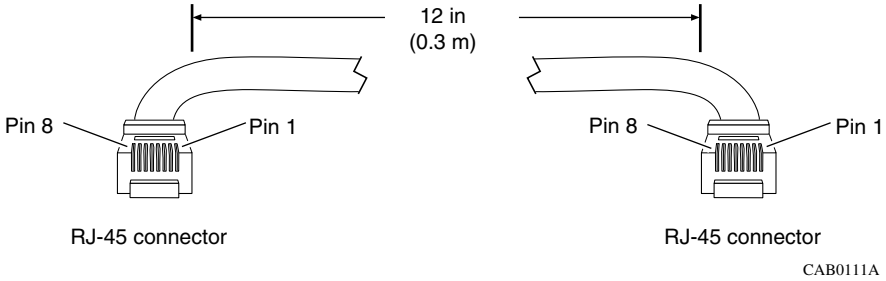
Industry Interface Type: T1/DS1

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Transmit Tip	1	1	Transmit Tip
Transmit Ring	9	9	Transmit Ring
Receive Tip	3	3	Receive Tip
Receive Ring	11	11	Receive Ring
Ground	2	4	Ground*
Ground	2	4	Ground*

* You must configure onboard jumpers to complete this connection. Refer to the table called “QMCT1 Link Module Settings” in *Installing T1 Link Modules in BN Platforms*.

ATM E1 RJ-45 to RJ-45 Cable (Order No. AA0018040)

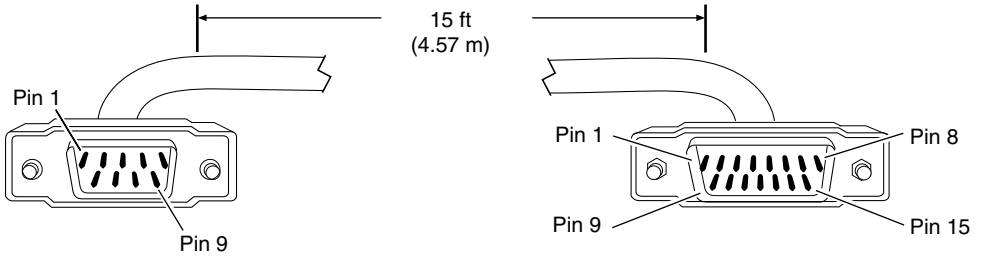
Note: This cable assembly uses a 120-ohm wire, and is used with the AA0018040 Balun described in Chapter 8.



Industry Interface Type: E1

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Receive Ring	1	4	Receive Ring
Receive Tip	2	5	Receive Tip
Transmit Ring	4	1	Transmit Ring
Transmit Tip	5	2	Transmit Tip

MCT1 Clock Cable (Order No. 7150)



9-position D-sub plug with screw locks
(ground shield connected to backshell)

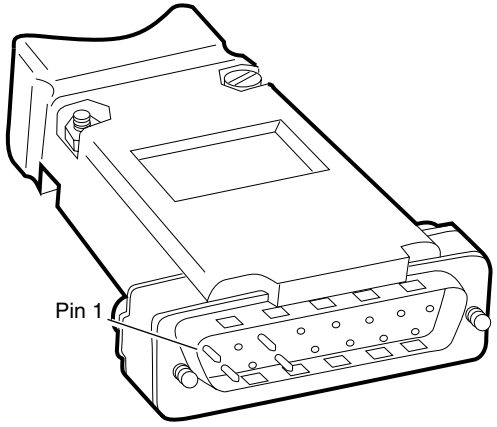
15-position D-sub plug with locking posts
(ground shield connected to backshell)

CAB0022A

Industry Interface Type: T1/DS1 External Clock (Input from an External T1 Timing Source)

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Receive Tip	2	1	Transmit Tip
Receive Ring	3	9	Transmit Ring

MCT1 15-Pin Loopback Connector (Order No. 7151)

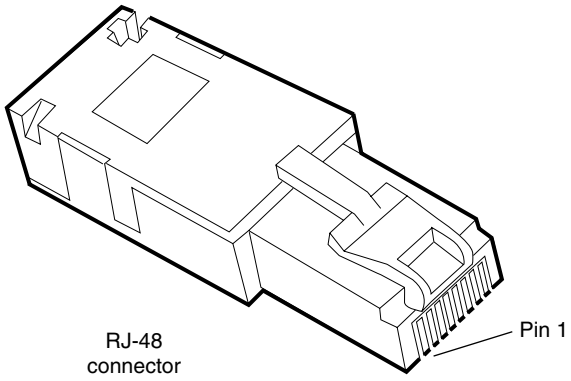


15-position connect

CAB0023A

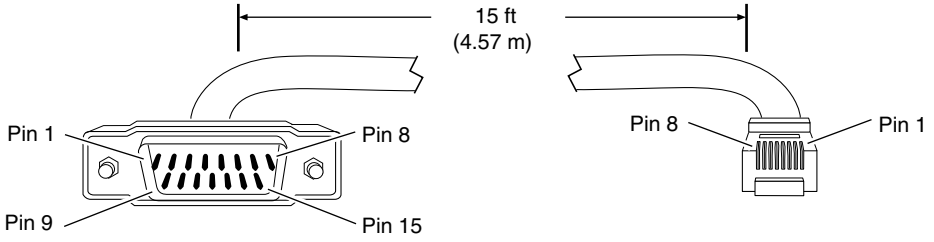
Nortel Networks Termination		Remote Termination	
Signal	**Pin # to Pin #**		**Signal**
Transmit Tip	1	3	Receive Tip
Transmit Ring	9	11	Receive Ring

MCT1 RJ-48 Loopback Connector (Order No. 7152)



Nortel Networks Termination		Remote Termination	
Signal	**Pin # to Pin #**		**Signal**
Receive Ring	1	4	Transmit Ring
Receive Tip	2	5	Transmit Tip

MCT1 Crossover Cable (Order No. 7153)



15-position D-sub plug with locking posts
(ground shield connected to backshell)

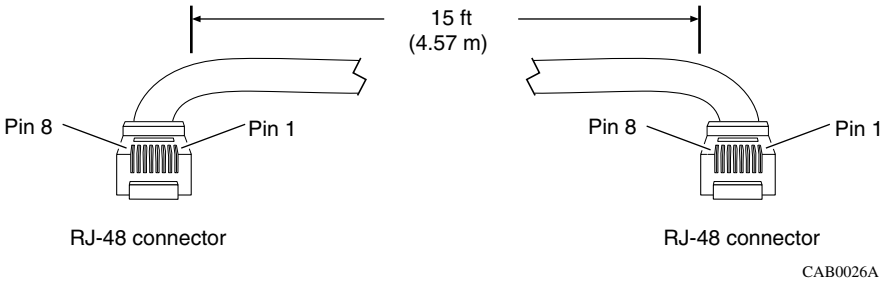
RJ-48 connector

CAB0025A

Industry Interface Type: T1/DS1

Nortel Networks Termination A		**Nortel Networks Termination B**	
Signal	**Pin # to Pin #**		**Signal**
Transmit Tip	1	2	Receive Tip
Receive Tip	3	5	Transmit Tip
Transmit Ring	9	1	Receive Ring
Receive Ring	11	4	Transmit Ring

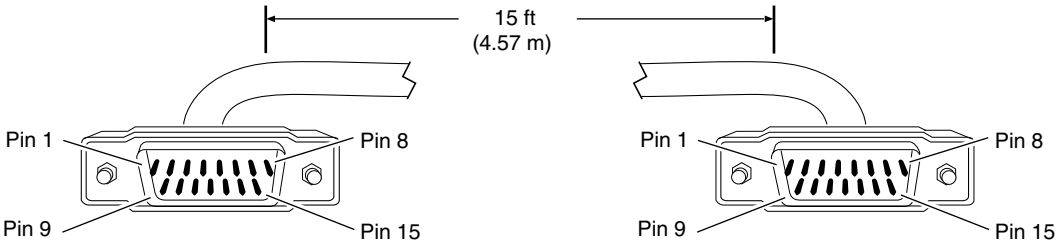
MCT1 Loopback Cable (Order No. 7154)



Industry Interface Type: T1/DS1

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Receive Ring	1	4	Transmit Ring
Receive Tip	2	5	Transmit Tip
Transmit Ring	4	1	Receive Ring
Transmit Tip	5	2	Receive Tip

MCT1 Loopback Cable (Order No. 7155)



15-position D-sub plug with locking posts
(ground shield connected to backshell)

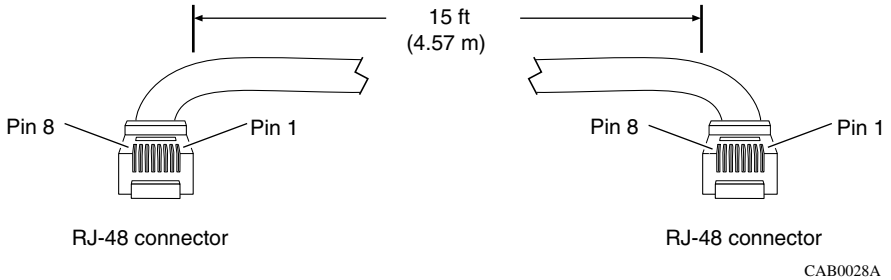
15-position D-sub plug with locking posts
(ground shield connected to backshell)

CAB0027A

Industry Interface Type: T1/DS1

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Transmit Tip	1	3	Receive Tip
Receive Tip	3	1	Transmit Tip
Transmit Ring	9	11	Receive Ring
Receive Ring	11	9	Transmit Ring

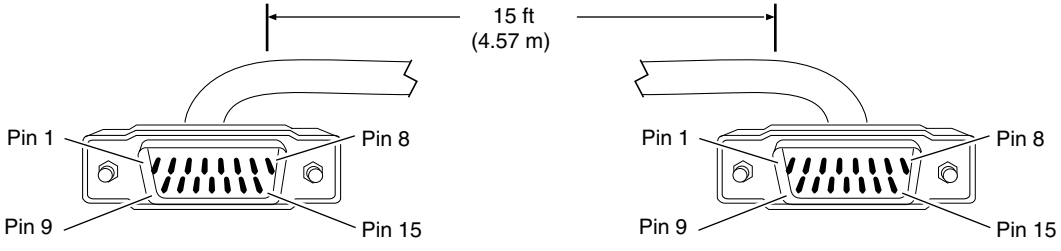
MCT1 Straight-Through Cable (Order No. 7156)



Industry Interface Type: T1/DS1

Nortel Networks Termination		Remote Termination	
Signal	**Pin # to Pin #**		**Signal**
Receive Tip	1	1	Receive Tip
Receive Ring	2	2	Receive Ring
Transmit Tip	4	4	Transmit Tip
Transmit Ring	5	5	Transmit Ring

MCT1 Straight-Through Cable (Order No. 7157)



15-position D-sub plug with locking posts
(ground shield connected to backshell)

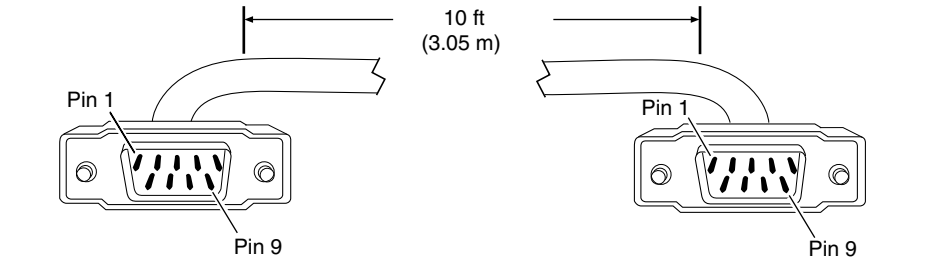
15-position D-sub plug with locking posts
(ground shield connected to backshell)

CAB0105A

Industry Interface Type: T1/DS1

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Transmit Tip	1	1	Transmit Tip
Transmit Ring	9	9	Transmit Ring
Receive Tip	3	3	Receive Tip
Receive Ring	11	11	Receive Ring

MCE1 Crossover Cable (Order No. 7160)



9-position D-sub plug with screw locks
(ground shield connected to backshell)

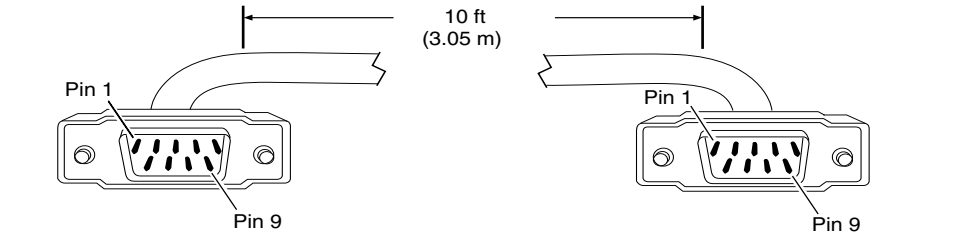
9-position D-sub plug with screw locks
(ground shield connected to backshell)

CAB0033A

Industry Interface Type: E1/G.703

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Receive A (RXA)	1	5	Transmit A (TXA)
Receive B (RXB)	6	9	Transmit B (TXB)
Transmit A (TXA)	5	1	Receive A (RXA)
Transmit B (TXB)	9	6	Receive B (RXB)
Internal Wire Connections			
Pin 3 (Shield)		Pin 3 (Shield grounded to backshell)	

MCE1 Straight-Through Cable (Order No. 7161)



9-position D-sub plug with screw locks
(ground shield connected to backshell)

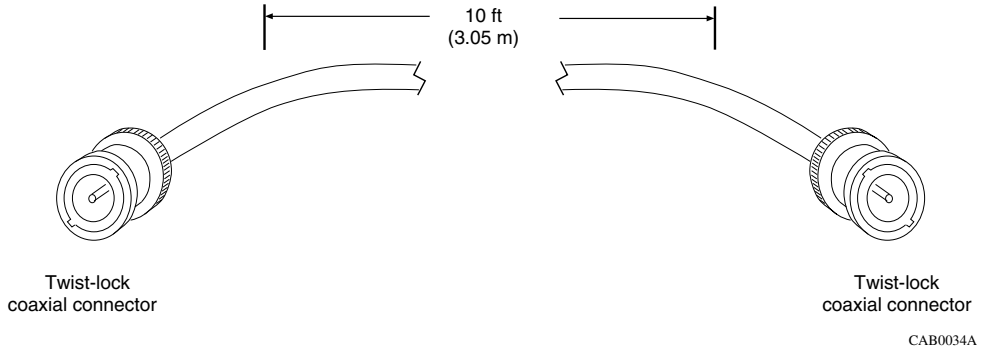
9-position D-sub plug with screw locks
(ground shield connected to backshell)

CAB0033A

Industry Interface Type: E1/G.703

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Receive A (RXA)	1	1	Receive A (RXA)
Receive B (RXB)	6	6	Receive B (RXB)
Transmit A (TXA)	5	5	Transmit A (TXA)
Transmit B (TXB)	9	9	Transmit B (TXB)
Internal Wire Connections			
Pin 3 (Shield)		Pin 3 (Shield grounded to backshell)	

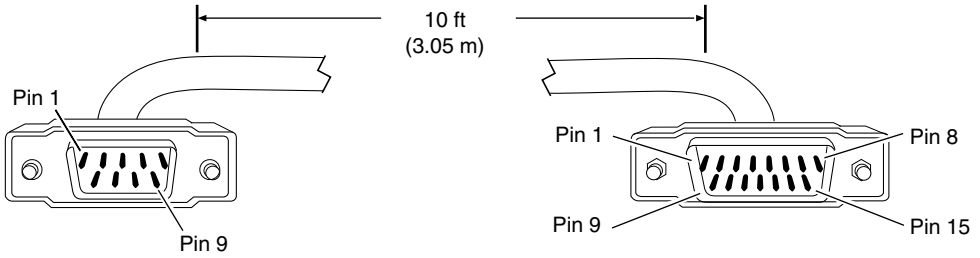
MCE1 Coaxial Cable (Order No. 7162)



Industry Interface Type: E1/G.703

MCE1 DB9 to DB15 Straight-Through Cable (Order No. 7167)

Note: This cable provides a direct connection to a 15-pin D-sub port.



9-position D-sub plug with screw locks
(ground shield connected to backshell)

15-position D-sub plug with locking posts
(ground shield connected to backshell)

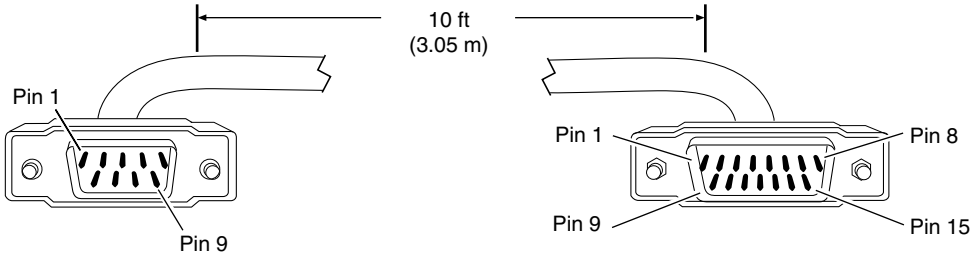
CAB0095B

Industry Interface Type: E1/G.703

Nortel Networks Termination		**Remote Termination**
Signal	**Pin # to Pin #**	**Signal**
Receive A	1 to 3	Receive A
Receive B	6 to 11	Receive B
Transmit A	5 to 1	Transmit A
Transmit B	9 to 9	Transmit B
Internal Wire Connections		
Pin 3 > Shield		

MCE1 DB9 to DB15 Crossover Cable (Order No. 7168)

Note: This cable provides a crossover connection to a 15-pin D-sub port.



9-position D-sub plug with screw locks
(ground shield connected to backshell)

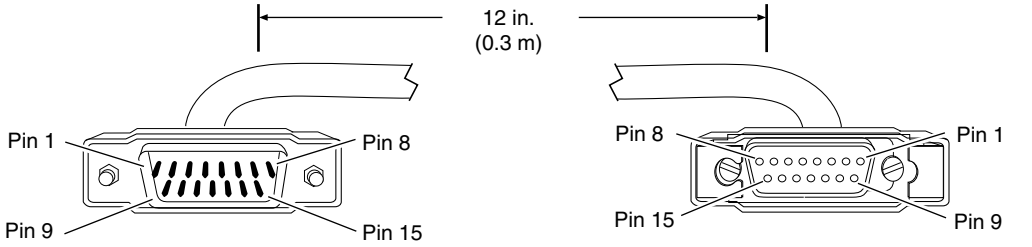
15-position D-sub plug with locking posts
(ground shield connected to backshell)

CAB0096B

Industry Interface Type: E1/G.703

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Receive A	1	1	Transmit A
Receive B	6	9	Transmit B
Transmit A	5	3	Receive A
Transmit B	9	11	Receive B
Internal Wire Connections			
Pin 3 > Shield			

T1 to CSU DTE (Order No. 7401)



15-position D-sub plug with locking posts (ground shield connected to backshell)

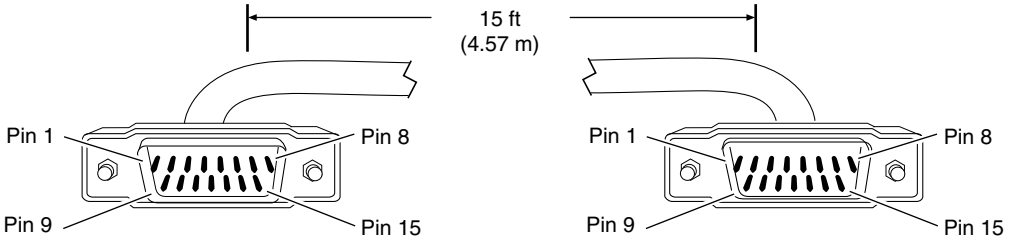
15-position D-sub receptacle with slide latch connected to backshell

CAB0052A

Industry Interface Type: T1/DS1

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Send +	1	1	Send +
Send -	9	9	Send -
Receive +	3	3	Receive +
Receive -	11	11	Receive -

T1 to Customer Premise Equipment (Order No. 7415)



15-position D-sub plug with locking posts
(ground shield connected to backshell)

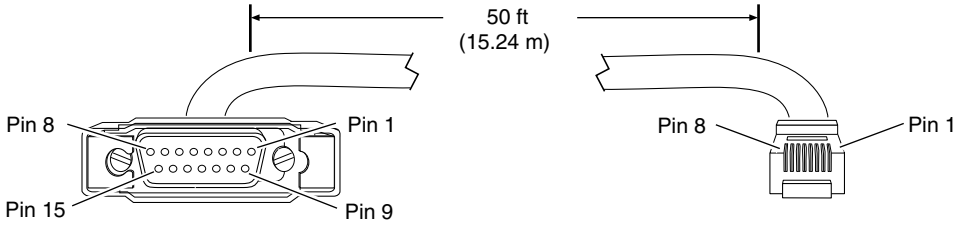
15-position D-sub plug with locking posts
(ground shield connected to backshell)

CAB0053A

Industry Interface Type: T1/DS1

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Send +	1	1	Send +
Send -	9	9	Send -
Receive +	3	3	Receive +
Receive -	11	11	Receive -

CSU Network Receptacle to RJ-45 (Order No. 7650)



15-position D-sub receptacle with slide latch connected to backshell

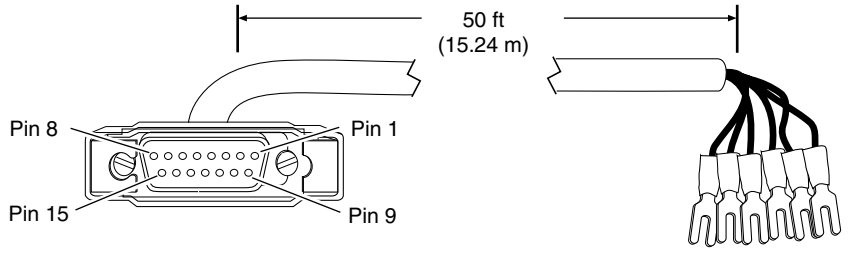
RJ-45 connector

CAB0057A

Industry Interface Type: T1/DS1

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Send +	1	5	Send +
Send -	9	4	Send -
Receive +	3	2	Receive +
Receive -	11	1	Receive -

CSU Network Receptacle to Spade Terminals (Order No. 7750)



Industry Interface Type: T1/DS1

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Signal Wire**		**Signal**
Send +	1	wire	XMIT +
Send -	9	wire	XMIT -
Receive +	3	wire	Receive +
Receive -	11	wire	Receive -
Ground	Chassis	wire	Shield
Ground	Chassis	wire	Shield

Chapter 6
Standard Synchronous Cables

This chapter identifies the standard synchronous cables that link Nortel Networks router software platforms to WAN devices.

Table 6-1 summarizes the cables. Detailed cable illustrations and pinout specifications follow.

Table 6-1. Standard Synchronous Cables

Order No.	Length	Physical Cable Description	Page
AA0018003	15 ft (4.57 m)	X.21 synchronous pass-through (15-pin D-sub plug to X.21 receptacle)	6-5
AA0018004	15 ft (4.57 m)	X.21 synchronous pass-through (44-pin D-sub plug to X.21 receptacle)	6-7
AA0018005	15 ft (4.57 m)	X.21 synchronous pass-through (50-pin plug to X.21 receptacle)	6-9
AA0018011	15 ft (4.57 m)	RS-530 straight-through cable (15-pin to RS-530 plug)	6-11
AA0018012	15 ft (4.57 m)	RS-530 straight-through cable (44-pin to RS-530 plug)	6-13
AA0018013	15 ft (4.57 m)	RS-530 straight-through cable (50-pin to RS-530 plug)	6-15
AA0018023	15 ft (4.57 m)	50-pin to V.28 cable	6-17
AA0018041	15 ft (4.57 m)	44-pin plug to RS-232-C DCE receptacle	6-69
AA0018042	15 ft (4.57 m)	44-pin plug to RS-422 DCE receptacle	6-71
AA0018043	15 ft (4.57 m)	44-pin plug to RS-530 DCE receptacle	6-73
AA0018044	15 ft (4.57 m)	44-pin plug to V.28 DCE receptacle	6-75
AA0018045	15 ft (4.57 m)	44-pin plug to V.35 DCE receptacle	6-77
AA0018046	15 ft (4.57 m)	44-pin plug to X.21 DCE receptacle	6-79
AA0018048	15 ft (4.57 m)	44-pin to RS-232-C loop timing	6-81

(continued)

Table 6-1. Standard Synchronous Cables *(continued)*

Order No.	Length	Physical Cable Description	Page
AA0018049	15 ft (4.57 m)	44-pin to RS-232-C standard	6-83
AA0018051	15 ft (4.57 m)	44-pin to RS-422 loop timing	6-85
AA0018052	15 ft (4.57 m)	44-pin to RS-422 standard	6-87
AA0018053	15 ft (4.57 m)	44-pin to RS-530 loop timing	6-89
AA0018054	15 ft (4.57 m)	44-pin to RS-530 standard	6-91
AA0018056	15 ft (4.57 m)	44-pin to V.28 loop timing	6-93
AA0018057	15 ft (4.57 m)	44-pin to V.28 standard	6-95
AA0018059	15 ft (4.57 m)	44-pin to V.35 loop timing	6-97
AA0018060	15 ft (4.57 m)	44-pin to V.35 standard	6-99
AA0018061	15 ft (4.57 m)	44-pin to 44-pin crossover	6-101
AA0018062	15 ft (4.57 m)	44-pin to X.21 loop timing	6-103
AA0018063	15 ft (4.57 m)	44-pin to X.21 standard	6-105
7158	10 ft (3.05 m)	15-pin to male V.35 plug	6-18
7159	10 ft (3.05 m)	44-pin to male V.35 plug	6-19
7215	15 ft (4.57 m)	15-pin D-sub plug to V.35 plug (no DTR; for WAN connection)	6-21
7216	15 ft (4.57 m)	15-pin D-sub plug to V.35 plug (with DTR)	6-23
7218	15 ft (4.57 m)	RS-232-C synchronous pass-through (15-pin D-sub plug to RS-232-C plug)	6-24
7219	15 ft (4.57 m)	V.35 synchronous pass-through (15-pin D-sub plug to V.35 plug)	6-25
7220	15 ft (4.57 m)	44-pin D-sub plug to V.35 plug (leased line or V.25bis; for WAN connection)	6-27
7221	15 ft (4.57 m)	15-pin D-sub plug to X.21 plug (for WAN connection)	6-29
7224	15 ft (4.57 m)	44-pin D-sub plug to X.21 plug (for WAN connection)	6-30
7255	15 ft (4.57 m)	15-pin D-sub plug to RS-232-C plug (for WAN connection)	6-31
7256	15 ft (4.57 m)	15-pin D-sub plug to V.28 plug (for WAN connection)	6-32
7260	15 ft (4.57 m)	15-pin to 15-pin synchronous crossover (for back-to-back node operation)	6-33
7315	15 ft (4.57 m)	15-pin D-sub plug to RS-422 plug (for WAN connection)	6-35
7318	15 ft (4.57 m)	44-pin D-sub plug to RS-422 plug (leased line or V.25bis; for WAN connection)	6-37

(continued)

Table 6-1. Standard Synchronous Cables *(continued)*

Order No.	Length	Physical Cable Description	Page
7826	15 ft (4.57 m)	44-pin D-sub plug to RS-232-C plug (leased line or V.25bis; for WAN connection)	6-39
7833	15 ft (4.57 m)	RS-232-C synchronous pass-through (44-pin D-sub plug to RS-232-C plug)	6-40
7834	15 ft (4.57 m)	V.35 synchronous pass-through (44-pin D-sub plug to V.35 plug)	6-41
7835	15 ft (4.57 m)	Nortel Networks V.35 crossover (44-pin D-sub plug to 44-pin D-sub plug)	6-43
7836	15 ft (4.57 m)	V.35 crossover (44-pin D-sub plug to 15-pin D-sub plug)	6-45
7837	15 ft (4.57 m)	44-pin D-sub plug to V.28 plug (for WAN connection)	6-47
7932	15 ft (4.57 m)	50-pin to V.35 plug	6-49
7934	15 ft (4.57 m)	50-pin to RS-232-C	6-51
7936	15 ft (4.57 m)	50-pin to X.21	6-52
7937	15 ft (4.57 m)	50-pin to RS-422	6-53
7938	15 ft (4.57 m)	50-pin to 50-pin crossover	6-55
7939	15 ft (4.57 m)	50-pin to 15-pin crossover	6-57
7940	15 ft (4.57 m)	50-pin to 44-pin crossover	6-59
7941	15 ft (4.57 m)	15-pin to female RS-232-C synchronous pass-through	6-61
7942	15 ft (4.57 m)	15-pin to female V.35 synchronous pass-through	6-62
7943	15 ft (4.57 m)	44-pin to female RS-232-C synchronous pass-through	6-63
7944	15 ft (4.57 m)	44-pin to female V.35 synchronous pass-through	6-64
7945	15 ft (4.57 m)	50-pin to female RS-232-C synchronous pass-through	6-66
7946	15 ft (4.57 m)	50-pin to female V.35 synchronous pass-through	6-67

Note: Refer to “New Synchronous Cable Cross Reference” in Chapter 1 for information about how to cross reference older 44-pin legacy cables to the new fully functional cables.

If you need to order additional cables, contact the Nortel Networks Technical Solutions Center in your area. (See “How to Get Help” in the preface.)

The following sections include:

- Cable illustrations with the Nortel Networks connector on the left and the remote connector on the right
- Cable length information

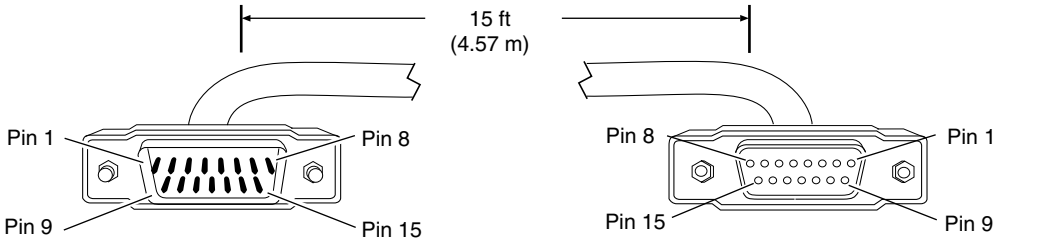
  If you want to build a cable, and you want to determine the maximum cable length appropriate for each of your interconnection requirements, you should:

  -- Identify in this chapter a cable that satisfies your wiring requirement (with the exception of total cable length).

  -- Consult the networking industry specification, standard, or recommendation designated in the “Industry Interface Type” entry for that cable (located immediately following the cable pinout diagram).
- Pinouts for each connector and all associated signals
- Wire jumper identification for each connector (when applicable)

  For example, the Sync to V.35 cable (Order No. 7215) lists internal wire connections (Pin 1 > 7) in the Nortel Networks Termination column. This indicates that you must connect pin 1 to pin 7 inside the Nortel Networks connector.
- Grounding arrangements that isolate the chassis from the DC ground within the cable

15-Pin to F X.21 Synchronous Pass-Through (Order No. AA0018003)



15-position D-sub plug with locking posts
(ground shield connected to backshell)

15-position D-sub receptacle with M-3 screw posts
(ground shield connected to backshell)

CAB0089A

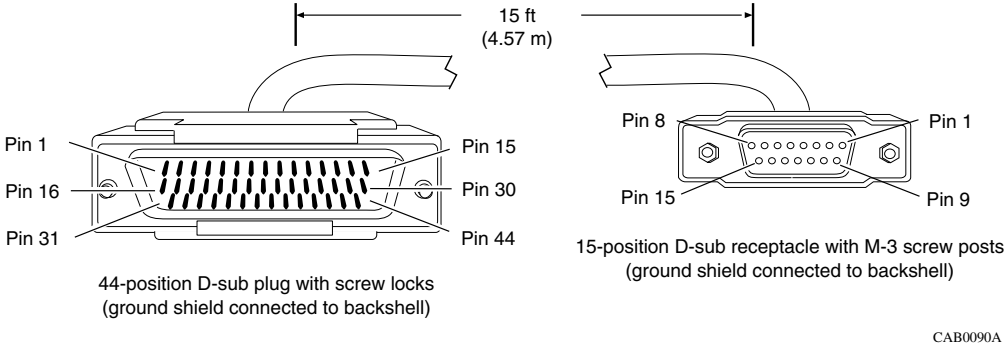
Industry Interface Type: X.21

Nortel Networks Termination		Remote Termination	
Signal	**Pin # to Pin #**		**Signal**
Transmit Data +	2	4	Receive Data A
Transmit Data -	3	11	Receive Data B
Timing +	4	6	Timing A
Timing -	5	13	Timing B
Request to Send +	6	5	Indication A
Data Carrier Detect -	9	10	Control B
Data Carrier Detect +	10	3	Control A
Receive Data -	13	9	Transmitted Data B
Receive Data +	14	2	Transmitted Data A
Request to Send -	15	12	Indication B
Frame Ground	1	1	Frame Ground
Internal Wire Connections			
		Pin 6 > 7 (X A)	
		Pin 13 > 14 (X B)	

Note: You must move Jumpers A-E to the X.21 (2-3) position to support this interface.

44-Pin F X.21 Synchronous Pass-Through (Order No. AA0018004)

Note: This cable provides you with a female termination as a DCE device.

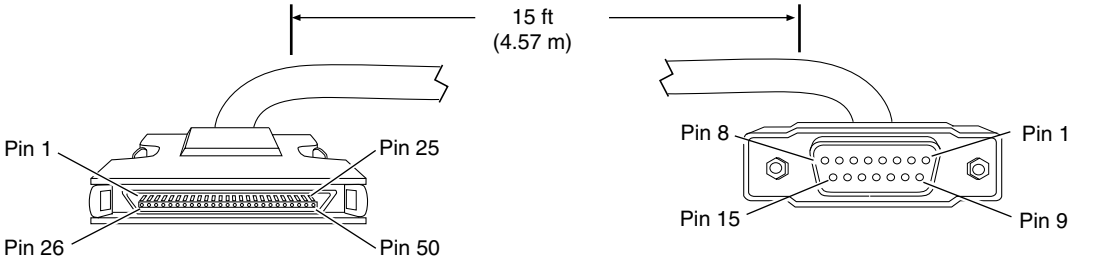


Industry Interface Type: X.21

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Send Data +	2	4	Receive Data A
Send Data -	16	11	Receive Data B
Receive Data +	3	2	Transmitted Data A
Receive Data -	17	9	Transmitted Data B
Request to Send +	4	5	Indication A
Request to Send -	18	12	Indication B
Data Carrier Detect +	9	3	Control A
Data Carrier Detect -	23	10	Control B
Transmitter Timing +	12	6	Timing A
Transmitter Timing -	26	13	Timing B
Frame Ground	1	1	Frame Ground
Signal Ground	7	8	Signal Ground
Internal Wire Connections			
Pin 12 > 10 (ST+)		Pin 6 > 7 (X A)	
Pin 26 > 24 (ST-)		Pin 13 > 14 (X B)	
Pin 14 > 15			
Pin 28 > 30			
Pin 41 > 43			

50-Pin to F X.21 Synchronous Pass-Through (Order No. AA0018005)

Note: This cable provides you with a female termination as a DCE device.



50-position 0.8-mm plug
(ground shield connected to internal shell)

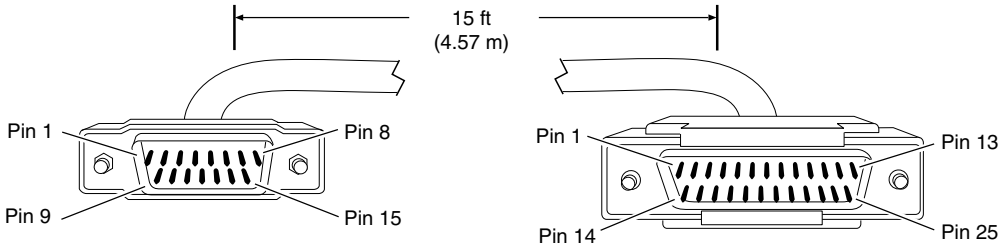
15-position D-sub receptacle with M-3 screw posts
(ground shield connected to backshell)

CAB0091A

Industry Interface Type: X.21

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Send Data +	2	4	Receive Data A
Send Data -	27	11	Receive Data B
Receive Data +	3	2	Transmitted Data A
Receive Data -	28	9	Transmitted Data B
Request to Send +	4	5	Indication A
Request to Send -	29	12	Indication B
Data Carrier Detect +	9	3	Control A
Data Carrier Detect -	34	10	Control B
Transmitter Timing +	12	6	Timing A
Transmitter Timing -	37	13	Timing B
Frame Ground	1	1	Frame Ground
Signal Ground	7	8	Signal Ground
Internal Wire Connections			
Pin 12 > 10 (ST+)		Pin 6 > 7 (X A)	
Pin 37 > 35 (ST-)		Pin 13 > 14 (X B)	
Pin 14 > 15			
Pin 38 > 40			
Pin 46 > 48			

15-Pin to RS-530 Straight-Through (Order No. AA0018011)



15-position D-sub plug with locking posts
(ground shield connected to backshell)

25-position D-sub plug with screw locks
(ground shield connected to backshell)

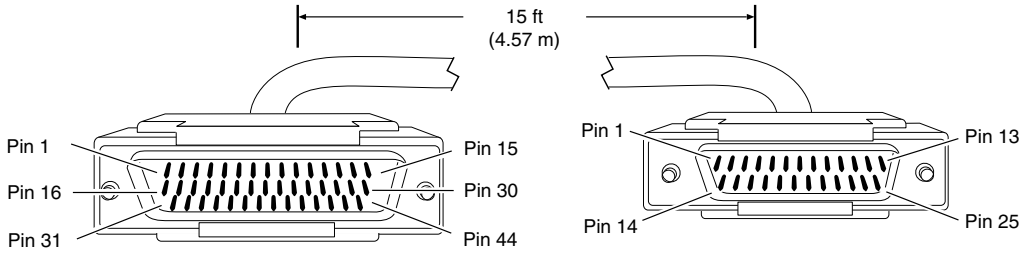
CAB0093A

Industry Interface Type: RS-530

Nortel Networks Termination		Remote Termination	
Signal	**Pin # to Pin #**		**Signal**
Send Data +	2	2	Transmitted Data A
Send Data -	3	14	Transmitted Data B
Receive Data +	14	3	Receive Data A
Receive Data -	13	16	Receive Data B
Request to Send +	6	4	Request to Send A
Request to Send -	15	19	Request to Send B
Clear to Send +	8	5	Clear to Send A
Clear to Send -	7	13	Clear to Send B
Data Carrier Detect +	10	8	Receive Line Signal Detect A
Data Carrier Detect -	9	10	Receive Line Signal Detect B
Send Timing +	4	15	Transmitter Signal Element Timing (DCE) A
Send Timing -	5	12	Transmitter Signal Element Timing (DCE) B
Receive Timing +	12	17	Receiver Signal Element Timing (DCE) A
Receive Timing -	11	9	Receiver Signal Element Timing (DCE) B
Signal Ground	1	7	Signal Ground

Note: You must move jumpers B and C to the X.21 (2-3) position to support this interface.

44-Pin to RS-530 Straight-Through (Order No. AA0018012)



44-position D-sub plug with screw locks
(ground shield connected to backshell)

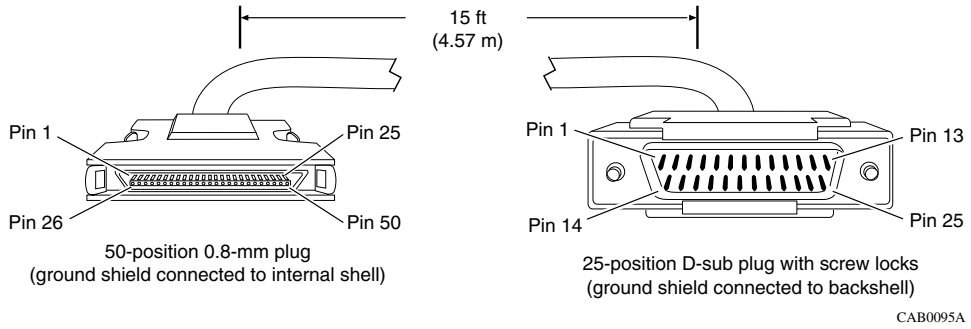
25-position D-sub plug with screw locks
(ground shield connected to backshell)

CAB0094A

Industry Interface Type: RS-530

Nortel Networks Termination		Remote Termination	
Signal	**Pin # to Pin #**		**Signal**
Send Data +	2	2	Transmitted Data A
Send Data -	16	14	Transmitted Data B
Receive Data +	3	3	Receive Data A
Receive Data -	17	16	Receive Data B
Request to Send +	4	4	Request to Send A
Request to Send -	18	19	Request to Send B
Clear to Send +	5	5	Clear to Send A
Clear to Send -	19	13	Clear to Send B
Data Set Ready +	6	6	DCE Ready A
Data Set Ready -	20	22	DCE Ready B
Data Terminal Ready +	8	20	DTE Ready A
Data Terminal Ready -	22	23	DTE Ready B
Data Carrier Detect +	9	8	Receive Line Signal Detect A
Data Carrier Detect -	23	10	Receive Line Signal Detect B
Send Timing +	10	15	Transmitter Signal Element Timing (DCE) A
Send Timing -	24	12	Transmitter Signal Element Timing (DCE) B
Receive Timing +	11	17	Receiver Signal Element Timing (DCE) A
Receive Timing -	25	9	Receiver Signal Element Timing (DCE) B
Transmitter Timing +	12	24	Transmitter Signal Element Timing (DTE) A
Transmitter Timing -	26	11	Transmitter Signal Element Timing (DTE) B
Signal Ground	7	7	Signal Ground
Internal Wire Connections			
Pin 13 > 28			
Pin 14 > 29			
Pin 41 > 43			

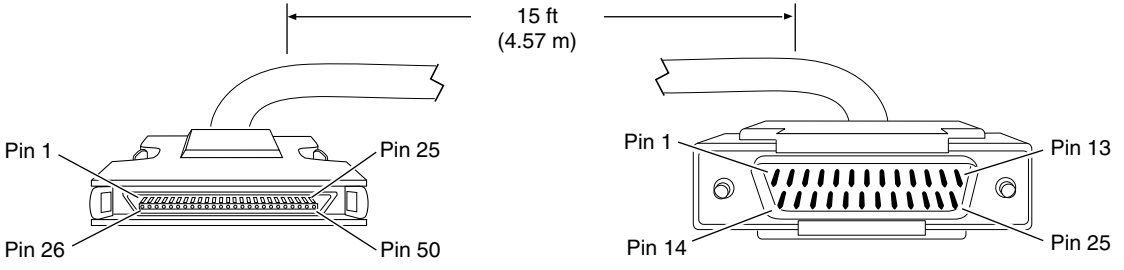
50-Pin to RS-530 Straight-Through (Order No. AA0018013)



Industry Interface Type: RS-530

Nortel Networks Termination		Remote Termination	
Signal	**Pin # to Pin #**		**Signal**
Send Data +	2	2	Transmitted Data A
Send Data -	27	14	Transmitted Data B
Receive Data +	3	3	Receive Data A
Receive Data -	28	16	Receive Data B
Request to Send +	4	4	Request to Send A
Request to Send -	29	19	Request to Send B
Clear to Send +	5	5	Clear to Send A
Clear to Send -	30	13	Clear to Send B
Data Set Ready +	6	6	DCE Ready A
Data Set Ready -	31	22	DCE Ready B
Data Terminal Ready +	8	20	DTE Ready A
Data Terminal Ready -	33	23	DTE Ready B
Data Carrier Detect +	9	8	Receive Line Signal Detect A
Data Carrier Detect -	34	10	Receive Line Signal Detect B
Send Timing +	10	15	Transmitter Signal Element Timing (DCE) A
Send Timing -	35	12	Transmitter Signal Element Timing (DCE) B
Receive Timing +	11	17	Receiver Signal Element Timing (DCE) A
Receive Timing -	36	9	Receiver Signal Element Timing (DCE) B
Transmitter Timing +	12	24	Transmitter Signal Element Timing (DTE) A
Transmitter Timing -	37	11	Transmitter Signal Element Timing (DTE) B
Signal Ground	7	7	Signal Ground
Internal Wire Connections			
Pin 13 > 38			
Pin 14 > 39			
Pin 46 > 48			

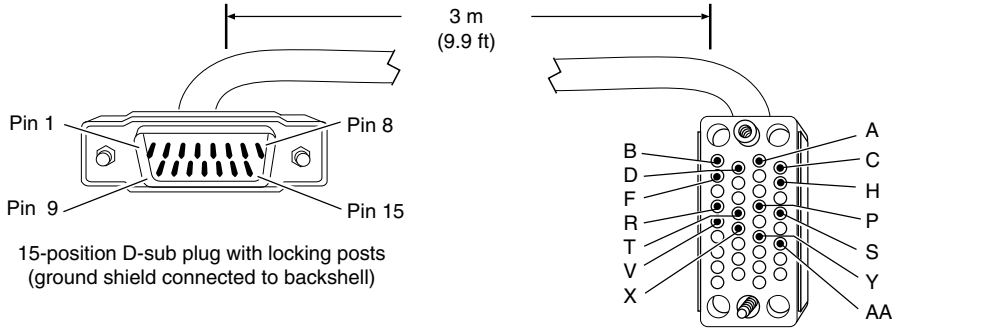
50-Pin to V.28 Cable (Order No. AA0018023)



Industry Interface Type: V.28 (V.10)

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Frame Ground	1	1	Frame Ground
Send Data +	2	2	Send Data
Receive Data +	3	3	Receive Data
Request to Send +	4	4	Request to Send
Clear to Send +	5	5	Clear to Send
Data Set Ready +	6	6	Data Set Ready
Signal Ground	7	7	Signal Ground
Data Terminal Ready +	8	20	Data Terminal Ready
Data Carrier Detect +	9	8	Data Carrier Detect
Send Timing +	10	15	Send Timing
Receive Timing +	11	17	Receive Timing
Terminal Timing +	12	24	Terminal Timing
Internal Wire Connections			
Pin 7 > 30 > 31			
Pin 13 > 38			
Pin 14 > 39			

15-Pin to V.35M (Order No. 7158)



15-position D-sub plug with locking posts
(ground shield connected to backshell)

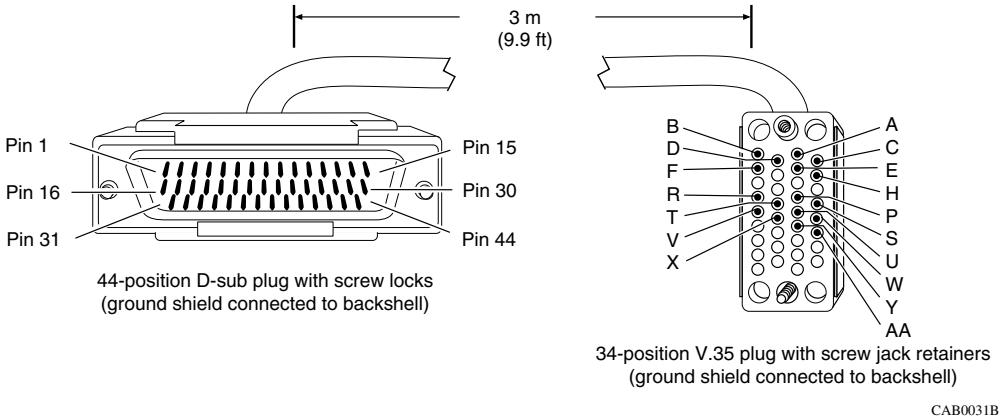
34-position V.35 plug with screw jack retainers
(ground shield connected to backshell)

CAB0030A

Industry Interface Type: V.35 (V.10 and V.11)

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Signal Ground	1	B	Signal Ground
Send Data +	2	P	Send Data (Signal A)
Send Data -	3	S	Send Data (Signal B)
Serial Clock Transmit +	4	Y	Serial Clock Transmit (Signal A)
Serial Clock Transmit -	5	AA	Serial Clock Transmit (Signal B)
Request to Send +	6	C	Request to Send
Clear to Send +	8	D	Clear to Send
Data Carrier Detect +	10	F	Data Carrier Detect
Serial Clock Receive -	11	X	Serial Clock Receive (Signal B)
Serial Clock Receive +	12	V	Serial Clock Receive (Signal A)
Receive Data -	13	T	Receive Data (Signal B)
Receive Data +	14	R	Receive Data (Signal A)
Internal Wire Connections			
Pin 1 > 7		Pin C > H	

44-Pin to V.35M (Order No. 7159)



44-position D-sub plug with screw locks
(ground shield connected to backshell)

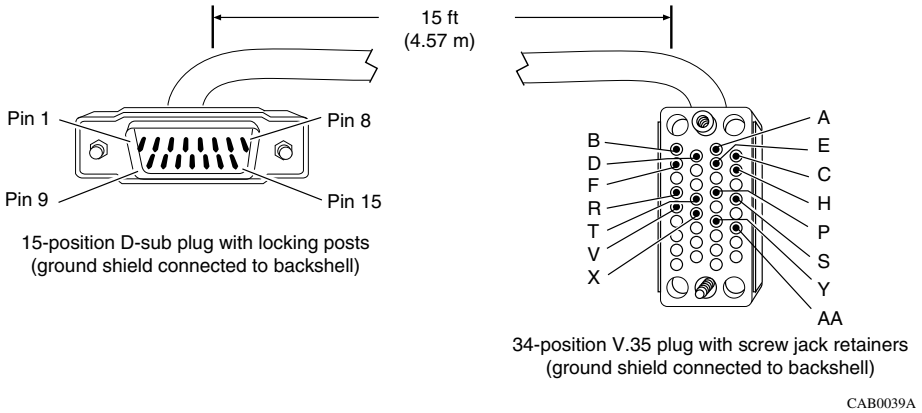
34-position V.35 plug with screw jack retainers
(ground shield connected to backshell)

CAB0031B

Industry Interface Type: V.35 (V.10 and V.11)

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Frame Ground	1	A	Frame Ground
Request to Send +	4	C	Request to Send
Clear to Send +	5	D	Clear to Send
Data Set Ready +	6	E	Data Set Ready
Data Terminal Ready +	8	H	Data Terminal Ready
Data Carrier Detect +	9	F	Data Carrier Detect
VTT +	40	U	Terminal Timing A
VTT -	39	W	Terminal Timing B
Signal Ground	19	B	Signal Ground
VST +	32	Y	Send Timing A
VST -	31	AA	Send Timing B
VRT +	34	V	Receive Timing A
VRT -	33	X	Receive Timing B
VRD +	37	R	Receive Data A
VRD -	35	T	Receive Data B
VSD +	38	P	Send Data A
VSD -	36	S	Send Data B
Internal Wire Connections			
Pin 7 > 19 > 20			
Pin 41 > 42 > 43			
Pin 13 > 28			
Pin 14 > 29			

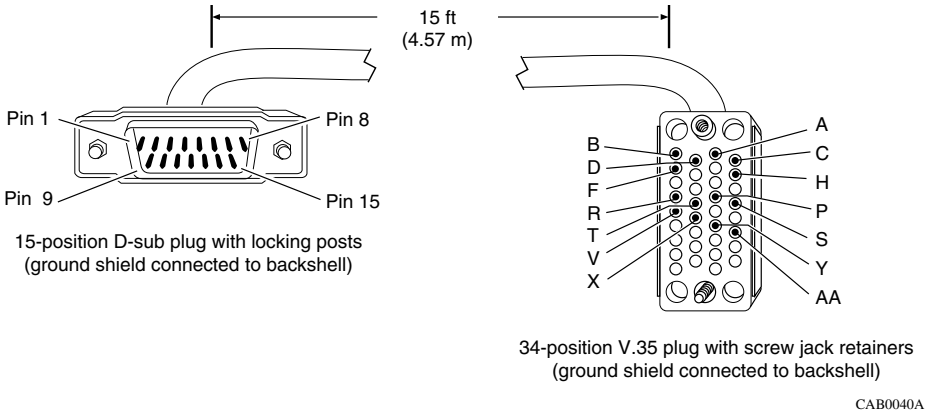
15-Pin D-Sub to V.35: No DTR, for WAN (Order No. 7215)



Industry Interface Type: V.35 (V.10 and V.11)

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Signal Ground	1	B	Signal Ground
Send Data +	2	P	Send Data A
Send Data -	3	S	Send Data B
Serial Clock Transmit +	4	Y	Serial Clock Transmit A
Serial Clock Transmit -	5	AA	Serial Clock Transmit B
Request to Send +	6	C	Request to Send
Clear to Send +	8	D	Clear to Send
Data Carrier Detect +	10	F	Data Carrier Detect
Serial Clock Receive -	11	X	Serial Clock Receive B
Serial Clock Receive +	12	V	Serial Clock Receive A
Receive Data -	13	T	Receive Data B
Receive Data +	14	R	Receive Data A
Data Set Ready +	15	E	Data Set Ready
Internal Wire Connections			
Pin 1 > 7			

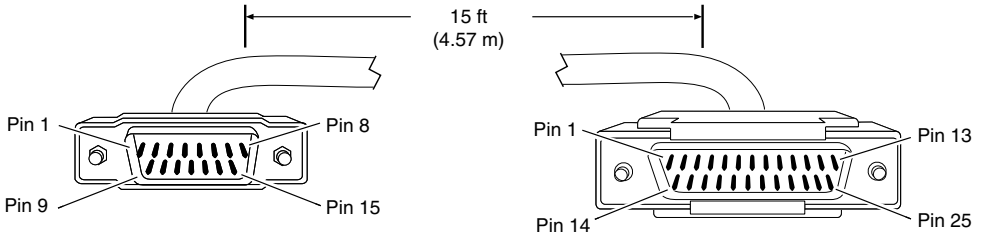
15-Pin D-Sub to V.35 with DTR (Order No. 7216)



Industry Interface Type: V.35 (V.10 and V.11)

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Signal Ground	1	B	Signal Ground
Send Data +	2	P	Send Data A
Send Data -	3	S	Send Data B
Serial Clock Transmit +	4	Y	Serial Clock Transmit A
Serial Clock Transmit -	5	AA	Serial Clock Transmit B
Request to Send +	6	C	Request to Send
Clear to Send ++	8	D	Clear to Send
Data Carrier Detect +	10	F	Data Carrier Detect
Serial Clock Receive -	11	X	Serial Clock Receive B
Serial Clock Receive +	12	V	Serial Clock Receive A
Receive Data -	13	T	Receive Data B
Receive Data +	14	R	Receive Data A
Internal Wire Connections			
Pin 1 > 7		Pin C > H	

RS-232-C Pass-Through: 15-Pin to RS-232-C (Order No. 7218)



15-position D-sub plug with locking posts
(ground shield connected to backshell)

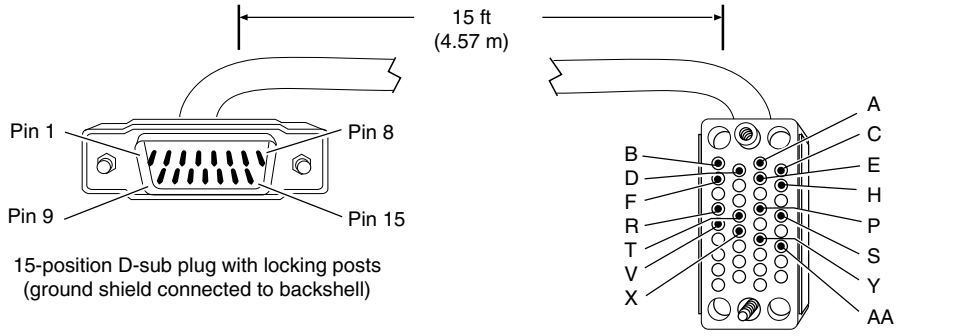
25-position D-sub plug with screw locks
(ground shield connected to backshell)

CAB0041A

Industry Interface Type: RS-232-C

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Signal Ground	1	7	Signal Ground
Transmitted Data	2	3	Received Data
Transmit Clock	4	15	Transmit Clock
Data Set Ready	6	8	Data Carrier Detect
Data Carrier Detect	10	4	Clear to Send
Receive Clock	12	17	Receive Clock
Received Data	14	2	Transmitted Data
Internal Wire Connections			
Pin 1 > 7		Pin 4 > 5	
Pin 6 > 8		Pin 6 > 20	
Pin 3 > 4 >12			

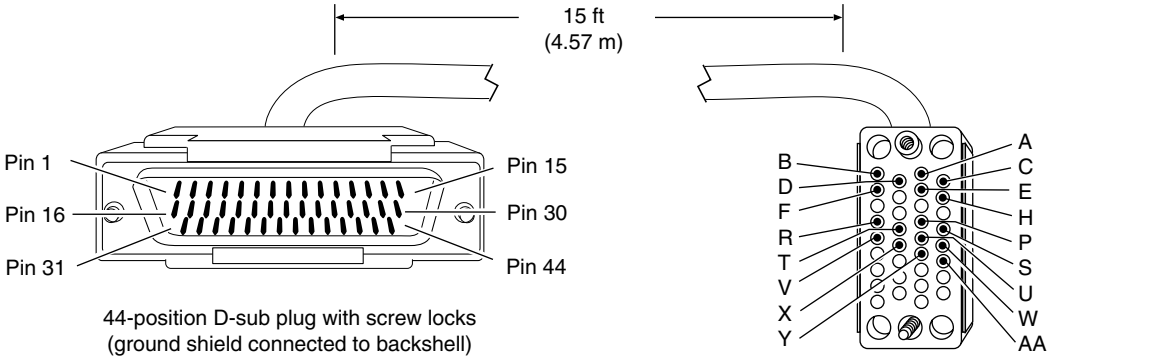
V.35 Pass-Through: 15-Pin to V.35 (Order No. 7219)



Industry Interface Type: V.35 (V.10 and V.11)

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Signal Ground	1	B	Signal Ground
Transmit Data +	2	R	Receive Data A
Transmit Data -	3	T	Receive Data B
Serial Clock Transmit +	4	Y	Serial Clock Transmit A
Serial Clock Transmit -	5	AA	Serial Clock Transmit B
Request to Send	6	F	Data Carrier Detect
Data Carrier Detect	10	D	Clear to Send
Serial Clock Receive -	11	X	Serial Clock Receive B
Serial Clock Receive +	12	V	Serial Clock Receive A
Receive Data -	13	S	Transmit Data B
Receive Data +	14	P	Transmit Data A
Internal Wire Connections			
Pin 6 > 8		Pin C > D	
Pin 4 > 12		Pin E > H	
Pin 5 > 11			
Pin 1 > 7			

44-Pin D-Sub to V.35: Leased Line or V.25bis (Order No. 7220)



44-position D-sub plug with screw locks
(ground shield connected to backshell)

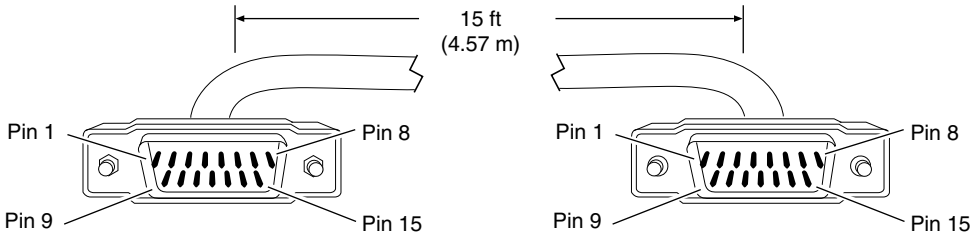
34-position V.35 plug with screw jack retainers
(ground shield connected to backshell)

CAB0106A

Industry Interface Type: V.35 (V.10 and V.11)

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
VSD +	38	P	Send Data A
VSD -	36	S	Send Data B
VRT +	34	V	Receive Timing A
VRT -	33	X	Receive Timing B
VST +	32	Y	Send Timing A
VST -	31	AA	Send Timing B
VRD +	37	R	Receive Data A
VRD -	35	T	Receive Data B
Data Set Ready +	6	E	Data Set Ready
Data Terminal Ready +	8	H	Data Terminal Ready
Request to Send +	4	C	Request to Send
Clear to Send +	5	D	Clear to Send
VTT +	40	U	Terminal Timing A
VTT -	39	W	Terminal Timing B
Frame Ground	1	A	Frame Ground
Data Carrier Detect +	9	F	Data Carrier Detect
Signal Ground	19	B	Signal Ground
Internal Wire Connections			
Pin 7 > 19 > 20			
Pin 41 > 42 > 43			
Pin 13 > 28			
Pin 14 > 29			

15-Pin D-Sub to X.21 (Order No. 7221)



15-position D-sub plug with locking posts (ground shield connected to backshell)

15-position D-sub plug with M-3 jack screws (ground shield connected to backshell)

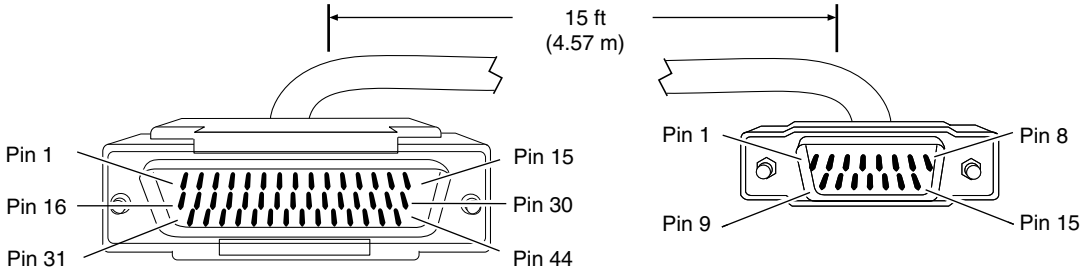
CAB0044A

Industry Interface Type: X.21 (V.11)

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Ground	1	1	Ground
Send Data +	2	2	Transmitted Data A
Send Data -	3	9	Transmitted Data B
Request to Send +	6	3	Control A
Request to Send -	15	10	Control B
Receive Data +	14	4	Receive Data A
Receive Data -	13	11	Receive Data B
Data Carrier Detect +	10	5	Indication A
Data Carrier Detect -	9	12	Indication B
Send Timing +	4	6	Timing A
Send Timing -	5	13	Timing B

Note: You must move Jumpers A-E to the X.21 (2-3) position to support this interface.

44-Pin D-Sub to X.21 (Order No. 7224)



44-position D-sub plug with screw locks
(ground shield connected to backshell)

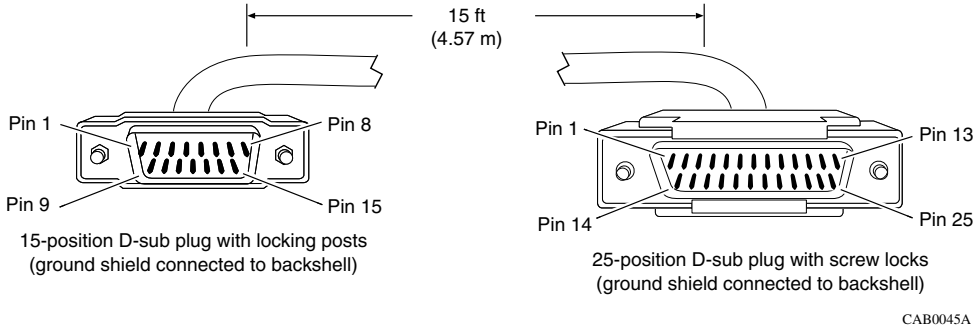
15-position D-sub plug with M-3 jack screws
(ground shield connected to backshell)

CAB0104A

Industry Interface Type: X.21 (V.11)

Nortel Networks Termination		**Remote Termination**
Signal	**Pin # to Pin #**	**Signal**
Send Data +	2	2 Transmitted Data A
Send Data -	16	9 Transmitted Data B
Request to Send +	4	3 Control A
Request to Send -	18	10 Control B
Receive Data +	3	4 Receive Data A
Receive Data -	17	11 Receive Data B
Data Carrier Detect +	9	5 Indication A
Data Carrier Detect -	23	12 Indication B
Send Timing +	10	6 Timing A
Send Timing -	24	13 Timing B
Signal Ground	7	8 Signal Ground
Frame Ground	1	1 Frame Ground
Internal Wire Connections		
Pin 14 > 15		
Pin 28 > 30		
Pin 41 > 43		

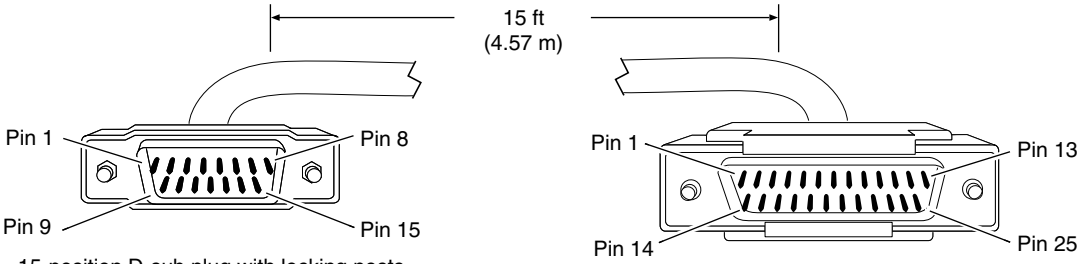
15-Pin D-Sub to RS-232-C (Order No. 7255)



Industry Interface Type: RS-232-C

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Signal Ground	1	7	Signal Ground
Transmitted Data	2	2	Transmitted Data
Transmitter Signal Element Timing (DTE Source)	3	24	Transmitter Signal Element Timing (DTE Source)
Transmitter Signal Element Timing (DCE Source)	4	15	Transmitter Signal Element Timing (DCE Source)
Request to Send	6	4	Request to Send
Clear to Send	8	5	Clear to Send
Carrier Detect	10	8	Carrier Detect
Receiver Signal Element Timing (DCE Source)	12	17	Receiver Signal Element Timing (DCE Source)
Received Data	14	3	Received Data
Data Set Ready	15	6	Data Set Ready
Internal Wire Connections			
Pin 1 > 7		Pin 4 > 20	

15-Pin D-Sub to V.28 (Order No. 7256)



15-position D-sub plug with locking posts
(ground shield connected to backshell)

25-position D-sub plug with M-3 jack screws
(ground shield connected to backshell)

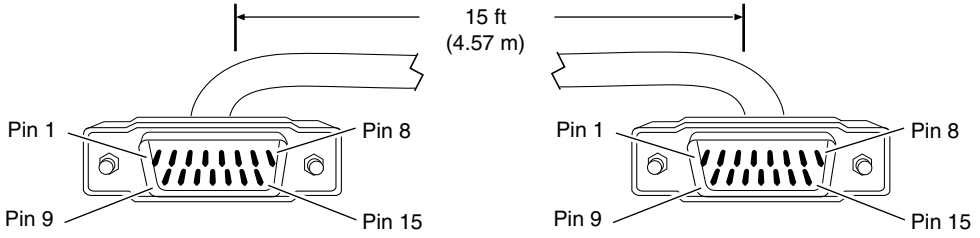
CAB0045B

Industry Interface Type: V.28 (V.10)

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Signal Ground	1	7	Signal Ground
Transmitted Data	2	2	Transmitted Data
Transmitter Timing (DTE Source)	3	24	Transmitter Signal Element Timing (DTE Source)
Transmitter Signal Element Timing (DCE Source)	4	15	Transmitter Signal Element Timing (DCE Source)
Request to Send	6	4	Request to Send
Clear to Send	8	5	Clear to Send
Carrier Detect	10	8	Carrier Detect
Receiver Signal Element Timing (DCE Source)	12	17	Receiver Signal Element Timing (DCE Source)
Received Data	14	3	Received Data
Data Set Ready	15	6	Data Set Ready
Internal Wire Connections			
Pin 1 > 7		Pin 4 > 20	

15-Pin Crossover (Order No. 7260)

Note: This crossover cable interconnects two Nortel Networks router software platforms.



15-position D-sub plug with locking posts
(ground shield connected to backshell)

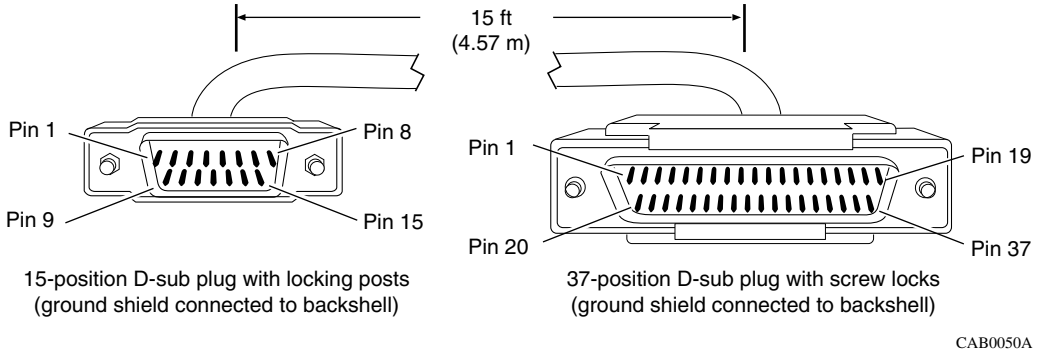
15-position D-sub plug with locking posts
(ground shield connected to backshell)

CAB0049A

Industry Interface Type: V.35

Nortel Networks Termination A		**Nortel Networks Termination B**	
Signal	**Pin # to Pin #**		**Signal**
Signal Ground	1	15	Return Common
Send Data +	2	14	Receive Data +
Send Data -	3	13	Receive Data -
Serial Clock Transmit +	4	12	Serial Clock Receive +
Serial Clock Transmit -	5	11	Serial Clock Receive -
Request to Send +	6	10	Data Carrier Detect +
Data Carrier Detect +	10	6	Request to Send +
Serial Clock Receive -	11	5	Serial Clock Transmit-
Serial Clock Receive +	12	4	Serial Clock Transmit +
Receive Data -	13	3	Send Data -
Receive Data +	14	2	Send Data +
Return Common	15	1	Signal Ground
Internal Wire Connections			
Pin 6 > 8		Pin 6 > 8	
Pin 7 > 9 > 15		Pin 7 > 9 > 15	

15-Pin D-Sub to RS-422 (Order No. 7315)

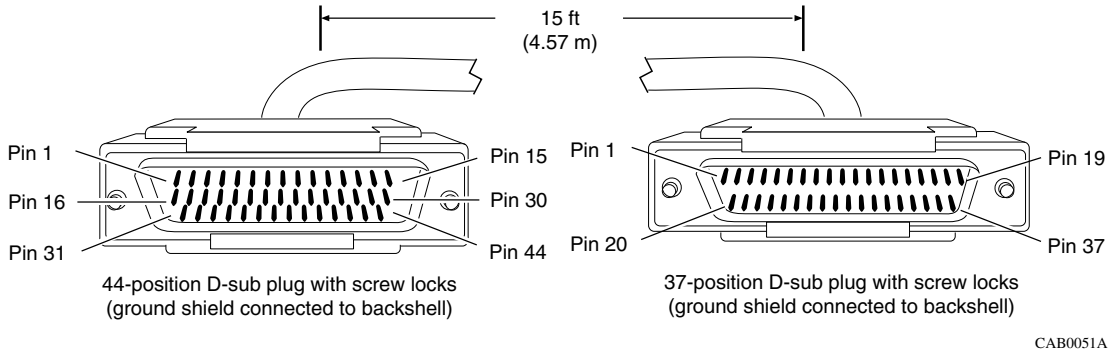


Industry Interface Type: RS-449/RS-422

Nortel Networks Termination		Remote Termination	
Signal	**Pin # to Pin #**		**Signal**
Signal Ground	1	25	Send Common
Send Data +	2	4	Send Data A
Send Data -	3	22	Send Data B
Serial Clock Transmit +	4	5	Send Timing A
Serial Clock Transmit -	5	23	Send Timing B
Request to Send	6	12	Terminal Ready A
Clear to Send -	7	27	Clear to Send B
Clear to Send +	8	9	Clear to Send A
Data Carrier Detect -	9	31	Data Carrier Detect B
Data Carrier Detect +	10	13	Data Carrier Detect A
Serial Clock Receive -	11	26	Receive Timing B
Serial Clock Receive +	12	8	Receive Timing A
Receive Data -	13	24	Receive Data B
Receive Data +	14	6	Receive Data A
Internal Wire Connections			
		Pin 7 > 12	
		Pin 25 > 30 > 37	

Note: You must move jumpers B and C to the X.21 (2-3) position to support this interface.

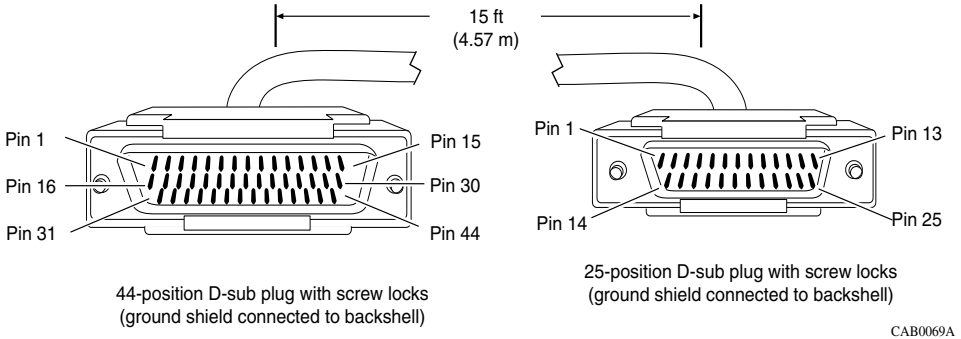
44-Pin D-Sub to RS-422: Leased Line or V.25bis (Order No. 7318)



Industry Interface Type: RS-449/RS-422

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Data Carrier Detect -	23	31	Receiver Ready B
Data Carrier Detect +	9	13	Receiver Ready A
Send Data +	2	4	Send Data A
Send Data -	16	22	Send Data B
Receive Timing +	11	8	Receive Timing A
Receive Timing -	25	26	Receive Timing B
Send Timing +	10	5	Send Timing A
Send Timing -	24	23	Send Timing B
Receive Data +	3	6	Receive Data A
Receive Data -	17	24	Receive Data B
Clear to Send -	19	27	Clear to Send B
Clear to Send +	5	9	Clear to Send A
Request to Send +	4	7	Request to Send A
Request to Send -	18	25	Request to Send B
Data Set Ready +	6	11	DM A
Data Set Ready -	20	29	DM B
Terminal Ready +	8	12	Terminal Ready A
Terminal Ready -	22	30	Terminal Ready B
Terminal Timing +	12	17	Terminal Timing A
Terminal Timing -	26	35	Terminal Timing B
Send Common	44	37	Send Common
Signal Ground	41	19	Signal Ground
Internal Wire Connections			
Pin 41 > 43		Pin 20 > 37	
Pin 13 > 28			
Pin 14 > 29			

44-Pin D-Sub to RS-232-C: Leased Line or V.25bis (Order No. 7826)



44-position D-sub plug with screw locks
(ground shield connected to backshell)

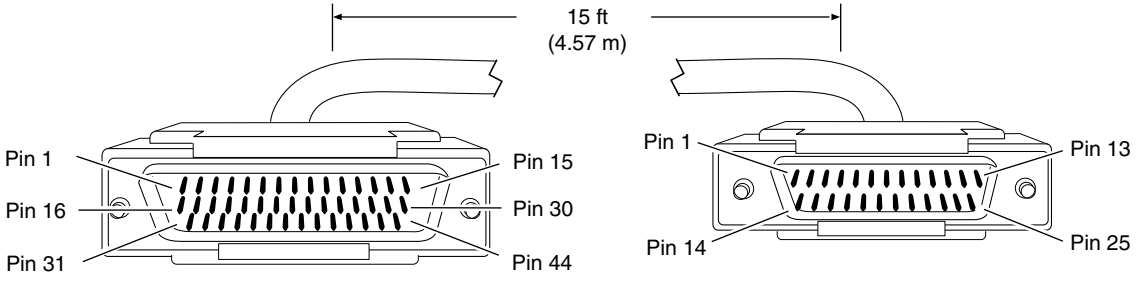
25-position D-sub plug with screw locks
(ground shield connected to backshell)

CAB0069A

Industry Interface Type: RS-232-C

Nortel Networks Termination		**Remote Termination**
Signal	**Pin # to Pin #**	**Signal**
Frame Ground	1	1 Frame Ground
Send Data +	2	2 Send Data
Receive Data +	3	3 Receive Data
Request to Send +	4	4 Request to Send
Clear to Send+	5	5 Clear to Send
Data Set Ready +	6	6 Data Set Ready
Data Terminal Ready +	8	20 Data Terminal Ready
Data Carrier Detect +	9	8 Data Carrier Detect
Send Timing +	10	15 Send Timing
Receive Timing +	11	17 Receive Timing
Transmitter Signal Element Timing +	12	24 Transmitter Signal Element Timing
Signal Ground	7	7 Signal Ground
Internal Wire Connections		
Pin 7 > 19 > 20		
Pin 13 > 28		
Pin 14 > 29		

RS-232-C Pass-Through: 44-Pin to RS-232-C (Order No. 7833)



44-position D-sub plug with screw locks
(ground shield connected to backshell)

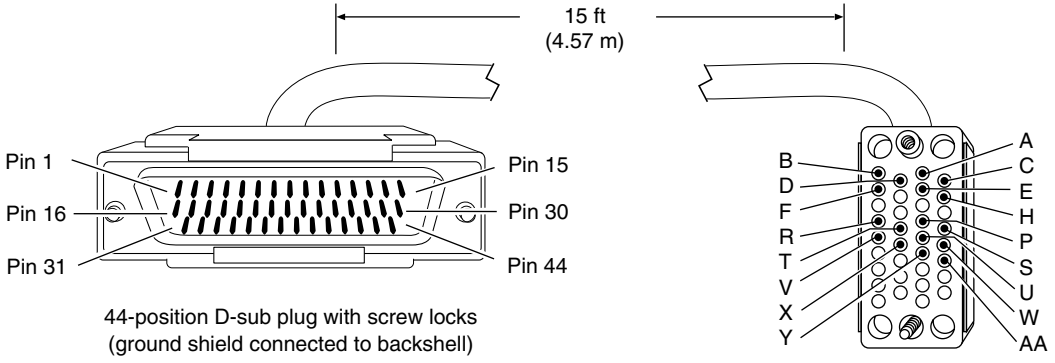
25-position D-sub plug with screw locks
(ground shield connected to backshell)

CAB0065A

Industry Interface Type: RS-232-C

Nortel Networks Termination		**Remote Termination**
Signal	**Pin # to Pin #**	**Signal**
Receive Data +	3	2 Send Data
Send Data +	2	3 Receive Data
Data Carrier Detect +	9	5 Clear to Send
RTS +	4	8 Data Carrier Detect
Send Timing +	10	17 Receive Timing
Frame Ground	1	1 Frame Ground
Signal Ground	7	7 Signal Ground
Internal Wire Connections		
Pin 4 > 5		Pin 4 > 5
Pin 10 > 11 > 12		Pin 15 > 17
Pin 7 > 19 > 20		Pin 6 > 20
Pin 13 > 28		
Pin 14 > 29		

V.35 Pass-Through: 44-Pin to V.35 (Order No. 7834)



44-position D-sub plug with screw locks
(ground shield connected to backshell)

34-position V.35 plug with screw jack retainers
(ground shield connected to backshell)

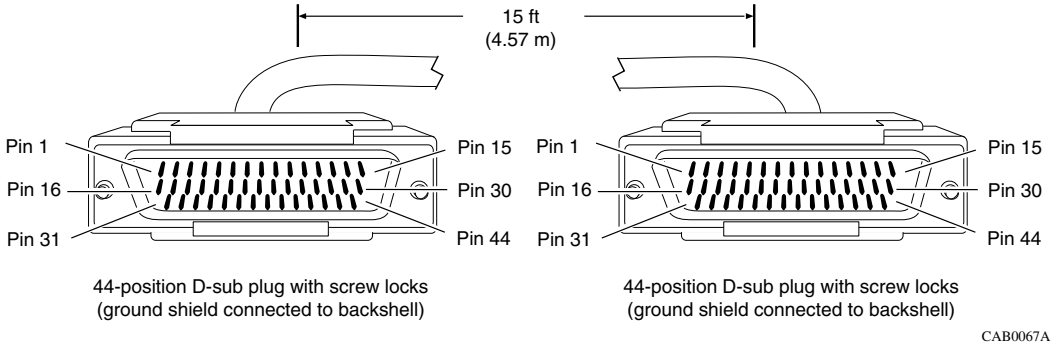
CAB0106A

Industry Interface Type: V.35 (V.10 and V.11)

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
VSD +	38	R	Receive Data A
VSD -	36	T	Receive Data B
VRD +	37	P	Send Data A
VRD -	35	S	Send Data B
Request to Send +	4	F	Data Carrier Detect
Data Carrier Detect +	9	D	Clear to Send
VTT +	40	V	Receive Timing A
VTT -	39	X	Receive Timing B
Frame Ground	1	A	Frame Ground
Signal Ground	7	B	Signal Ground
Internal Wire Connections			
Pin 4 > 5		Pin C > D	
Pin 32 > 34 > 40		Pin V > Y	
Pin 31 > 33 > 39		Pin X > AA	
Pin 7 > 19 > 20 > 41 > 42		Pin E > H	
Pin 13 > 28			
Pin 14 > 29			

V.35 Crossover: 44-Pin to 44-Pin (Order No. 7835)

Note: This crossover cable interconnects two Nortel Networks router software platforms.

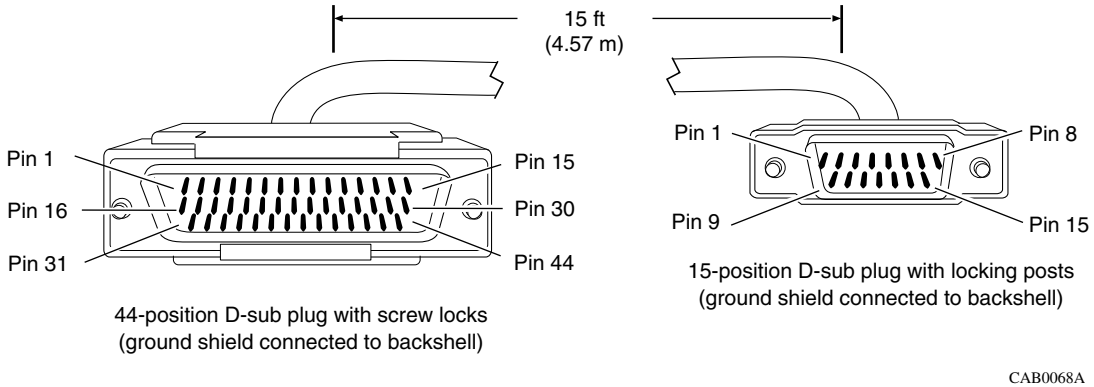


Industry Interface Type: V.35 (V.10 and V.11)

Nortel Networks Termination A		**Nortel Networks Termination B**	
Signal	**Pin # to Pin #**		**Signal**
VSD +	38	37	VRD +
VSD -	36	35	VRD -
VRD +	37	38	VSD +
VRD -	35	36	VSD -
RTS +	4	9	DCD +
DCD +	9	4	RTS +
VRT +	34	40	VTT +
VTT +	40	34	VRT +
VRT -	33	39	VTT -
VTT -	39	33	VRT -
Signal Ground	7	7	Signal Ground
Internal Wire Connections			
Pin 4 > 5 (CTS +)		Pin 4 > 5 (CTS +)	
Pin 32 (VST +) > 40 (VTT +)		Pin 32 (VST +) > 40 (VTT +)	
Pin 31 (VST -) > 39 (VTT -)		Pin 31 (VST -) > 39 (VTT -)	
Pin 7 > 19 > 20 > 23		Pin 7 > 19 > 20 > 23	
Pin 13 > 28		Pin 13 > 28	
Pin 14 > 29		Pin 14 > 29	
Pin 41 > 42 > 43		Pin 41 > 42 > 43	

V.35 Crossover: 44-Pin to 15-Pin (Order No. 7836)

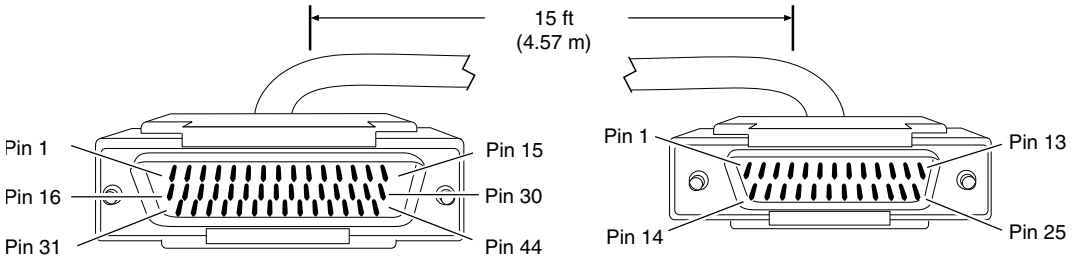
Note: This crossover cable interconnects two Nortel Networks router software platforms.



Industry Interface Type: V.35 (V.10 and V.11)

Nortel Networks Termination A		**Nortel Networks Termination B**	
Signal	**Pin # to Pin #**		**Signal**
VSD +	38	14	Receive Data A
VSD -	36	13	Receive Data B
VRT +	34	4	SCT A
VRT -	33	5	SCT B
VTT +	40	12	SCR A
VTT -	39	11	SCR B
VRD +	37	2	Send Data A
VRD -	35	3	Send Data B
Request to Send +	4	10	Data Carrier Detect A
Data Carrier Detect +	9	8	Clear to Send A
Signal Ground	7	1	Signal Ground
Internal Wire Connections			
Pin 32 > 40		Pin 6 > 8	
Pin 31 > 39		Pin 1 > 7 > 9 > 15	
Pin 4 > 5			
Pin 7 > 19 > 20 > 23			
Pin 13 > 28			
Pin 14 > 29			
Pin 41 > 42 > 43			

44-Pin D-Sub to V.28 (Order No. 7837)



44-position D-sub plug with screw locks
(ground shield connected to backshell)

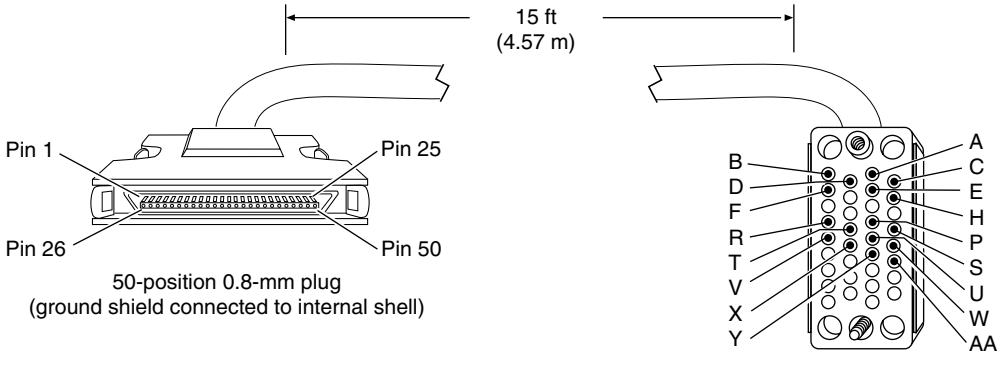
25-position D-sub plug with M-3 jack screws
(ground shield connected to backshell)

CAB0069B

Industry Interface Type: V.28 (V.10)

Nortel Networks Termination		Remote Termination	
Signal	**Pin # to Pin #**		**Signal**
Frame Ground	1	1	Frame Ground
Send Data +	2	2	Send Data
Receive Data +	3	3	Receive Data
Request to Send +	4	4	Request to Send
Clear to Send +	5	5	Clear to Send
Data Set Ready +	6	6	Data Set Ready
Data Terminal Ready +	8	20	Data Terminal Ready
Data Carrier Detect +	9	8	Data Carrier Detect
Send Timing +	10	15	Send Timing
Receive Timing +	11	17	Receive Timing
Transmitter Signal Element Timing +	12	24	Transmitter Signal Element Timing
Signal Ground	7	7	Signal Ground
Internal Wire Connections			
Pin 7 > 19 > 20			
Pin 13 > 28			
Pin 14 > 29			

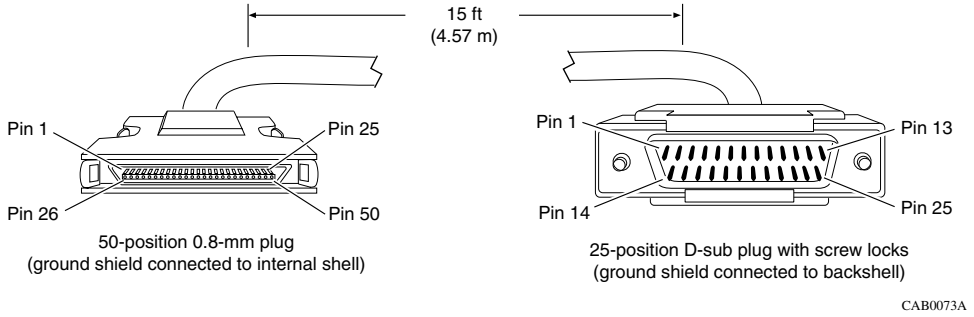
50-Pin to V.35 (Order No. 7932)



Industry Interface Type: V.35 (V.10 and V.11)

Nortel Networks Termination		Remote Termination	
Signal	**Pin # to Pin #**		**Signal**
VSD +	44	P	Send Data A
VSD -	19	S	Send Data B
VRT +	42	V	Receive Timing A
VRT -	17	X	Receive Timing B
VST +	41	Y	Send Timing A
VST -	16	AA	Send Timing B
VRD +	43	R	Receive Data A
VRD -	18	T	Receive Data B
Data Set Ready +	6	E	Data Set Ready
Data Terminal Ready +	8	H	Data Terminal Ready
Request to Send +	4	C	Request to Send
Clear to Send +	5	D	Clear to Send
VTT +	45	U	Terminal Timing A
VTT -	20	W	Terminal Timing B
Frame Ground	1	A	Frame Ground
Data Carrier Detect	9	F	Data Carrier Detect
Signal Ground	30	B	Signal Ground
Internal Wire Connections			
Pin 7 > 30 > 31			
Pin 46 > 47 > 48			
Pin 13 > 38			
Pin 14 > 39			

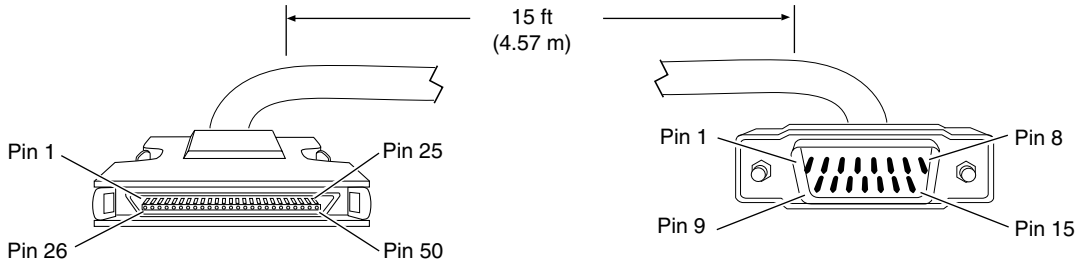
50-Pin to RS-232-C (Order No. 7934)



Industry Interface Type: RS-232-C

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Frame Ground	1	1	Frame Ground
Send Data +	2	2	Send Data
Receive Data +	3	3	Receive Data
Request to Send +	4	4	Request to Send
Clear to Send +	5	5	Clear to Send
Data Set Ready +	6	6	Data Set Ready
Signal Ground	7	7	Signal Ground
Data Terminal Ready +	8	20	Data Terminal Ready
Data Carrier Detect +	9	8	Data Carrier Detect
Send Timing +	10	15	Send Timing
Receive Timing +	11	17	Receive Timing
Terminal Timing +	12	24	Terminal Timing
Signal Ground	7	7	Signal Ground
Internal Wire Connections			
Pin 7 > 30 > 31			
Pin 13 > 38			
Pin 14 > 39			

50-Pin to X.21 (Order No. 7936)



50-position 0.8-mm plug
(ground shield connected to internal shell)

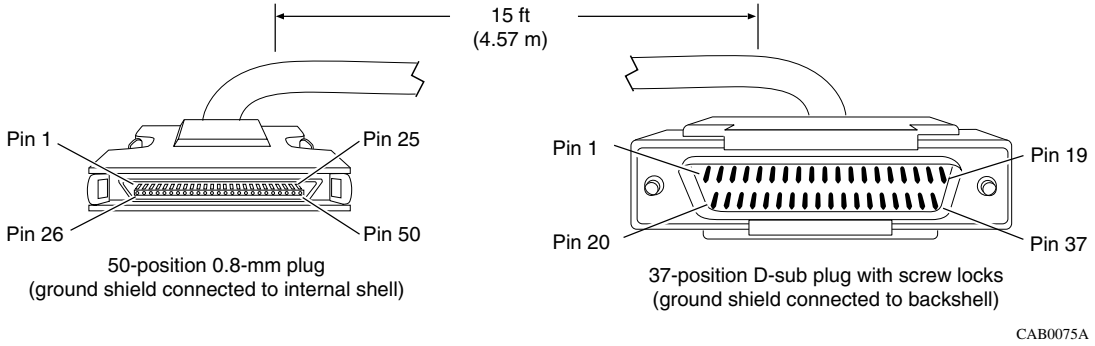
15-position D-sub plug with M-3 jack screws
(ground shield connected to backshell)

CAB0074A

Industry Interface Type: X.21 (V.11)

Nortel Networks Termination		**Remote Termination**
Signal	**Pin # to Pin #**	**Signal**
Send Data +	2	2 Transmitted Data A
Send Data -	27	9 Transmitted Data B
Request to Send +	4	3 Control A
Request to Send -	29	10 Control B
Receive Data +	3	4 Receive Data A
Receive Data -	28	11 Receive Data B
Data Carrier Detect +	9	5 Indication A
Data Carrier Detect -	34	12 Indication B
Timing +	10	6 Timing A
Timing -	35	13 Timing B
Frame Ground	1	1 Frame Ground
Signal Ground	7	8 Signal Ground
Internal Wire Connections		
Pin 46 > 48 (GRD)		
Pin 38 > 40		
Pin 14 > 15		

50-Pin to RS-422 (Order No. 7937)

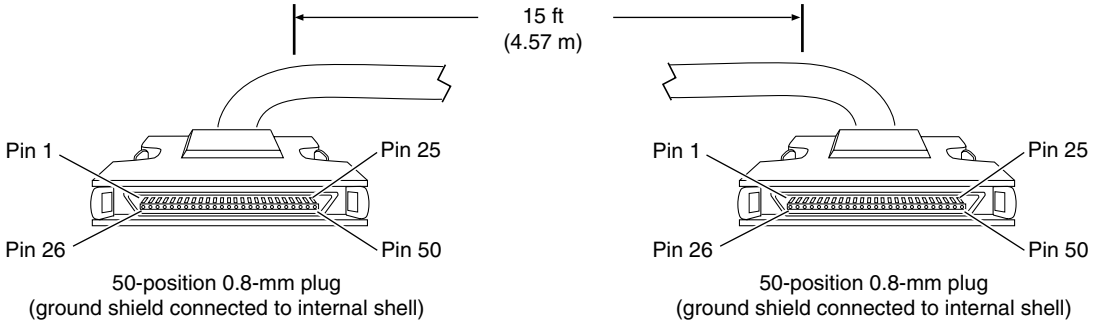


Industry Interface Type: RS-449/RS-422

Nortel Networks Termination		Remote Termination	
Signal	**Pin # to Pin #**		**Signal**
Data Carrier Detect -	34	31	Receiver Ready B
Data Carrier Detect +	9	13	Receiver Ready A
Send Data +	2	4	Send Data A
Send Data -	27	22	Send Data B
Receive Timing +	11	8	Receive Timing A
Receive Timing -	36	26	Receive Timing B
Send Timing +	10	5	Send Timing A
Send Timing -	35	23	Send Timing B
Receive Data +	3	6	Receive Data A
Receive Data -	28	24	Receive Data B
Clear to Send -	30	27	Clear to Send B
Clear to Send +	5	9	Clear to Send A
Request to Send +	4	7	Request to Send A
Request to Send -	29	25	Request to Send B
Data Set Ready +	6	11	Data Mode A
Data Set Ready -	31	29	Data Mode B
Terminal Ready +	8	12	Terminal Ready A
Terminal Ready -	33	30	Terminal Ready B
Terminal Timing +	12	17	Terminal Timing A
Terminal Timing -	37	35	Terminal Timing B
Send Common	49	37	Send Common
Signal Ground	48	19	Signal Ground
Internal Wire Connections			
Pin 46 (UNBE) > 48 (SGRD)		Pin 20 > 37	
Pin 13 > 38			
Pin 14 > 39			

50-Pin to 50-Pin Crossover (Order No. 7938)

Note: This crossover cable interconnects two Nortel Networks router software platforms.

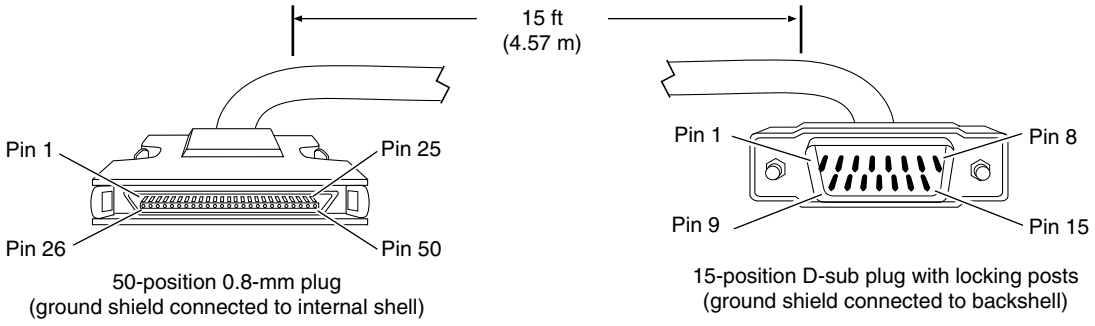


Industry Interface Type: V.35 (V.10 and V.11)

Nortel Networks Termination A		**Nortel Networks Termination B**	
Signal	**Pin # to Pin #**		**Signal**
VSD +	44	43	VRD +
VSD -	19	18	VRD -
VRD +	43	44	VSD +
VRD -	18	19	VSD -
Request to Send +	4	9	Data Carrier Detect +
Data Carrier Detect +	9	4	Request to Send +
VRT +	42	45	VTT +
VTT +	45	42	VRT +
VRT -	17	20	VTT -
VTT -	20	17	VRT -
Signal Ground	7	7	Signal Ground
Internal Wire Connections			
Pin 4 > 5 (CTS +)		Pin 4 > 5 (CTS +)	
Pin 41 (VST +) > 45 (VTT +)		Pin 41 (VST +) > 45 (VTT +)	
Pin 16 (VST -) > 20 (VTT -)		Pin 16 (VST -) > 20 (VTT -)	
Pin 7 > 30 > 31 > 34		Pin 7 > 30 > 31 > 34	
Pin 13 > 38		Pin 13 > 38	
Pin 14 > 39		Pin 14 > 39	
Pin 46 > 47 > 48		Pin 46 > 47 > 48	

50-Pin to 15-Pin Crossover (Order No. 7939)

Note: This crossover cable interconnects two Nortel Networks router software platforms.

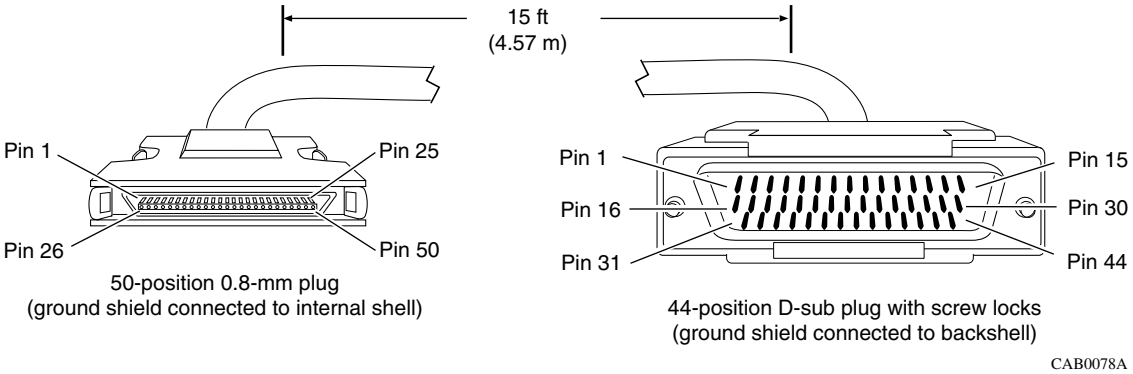


Industry Interface Type: V.35 (V10 and V.11)

Nortel Networks Termination A		**Nortel Networks Termination B**	
Signal	**Pin # to Pin #**		**Signal**
VSD +	44	14	Receive Data +
VSD -	19	13	Receive Data -
VRD +	43	2	Send Data +
VRD -	18	3	Send Data -
Request to Send +	4	10	Data Carrier Detect +
Data Carrier Detect +	9	6	Request to Send +
VRT +	42	4	SCT +
VTT +	45	12	SCR +
VRT -	17	5	SCT -
VTT -	20	11	SCR -
Signal Ground	7	1	Signal Ground
Internal Wire Connections			
Pin 4 > 5 (CTS +)		Pin 6 > 8 (CTS +)	
Pin 41 (VST +) > 45 (VTT +)		Pin 1 > 7 > 9 >15	
Pin 16 (VST -) > 20 (VTT -)			
Pin 7 > 30 > 31 > 34			
Pin 13 > 38			
Pin 14 > 39			
Pin 46 > 47 > 48			

50-Pin to 44-Pin Crossover (Order No. 7940)

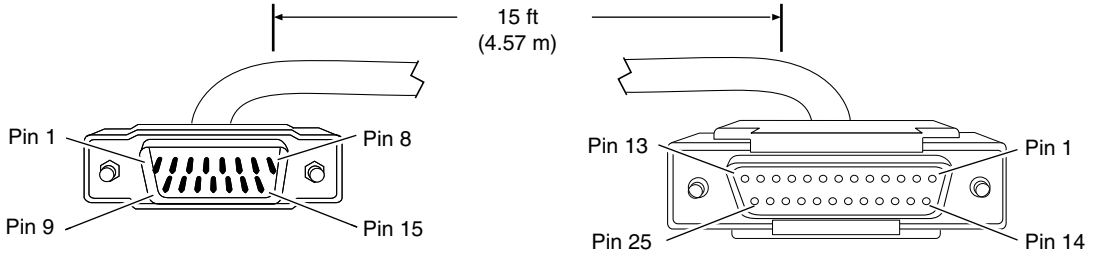
Note: This crossover cable interconnects two Nortel Networks router software platforms.



Industry Interface Type: V.35 (V.10 and V.11)

Nortel Networks Termination A		Nortel Networks Termination B	
Signal	**Pin # to Pin #**		**Signal**
VSD +	44	37	VRD +
VSD -	19	35	VRD -
VRD +	43	38	VSD +
VRD -	18	36	VSD -
Request to Send +	4	9	Data Carrier Detect +
Data Carrier Detect +	9	4	Request to Send +
VRT +	42	40	VTT +
VTT +	45	34	VRT +
VRT -	17	39	VTT -
VTT -	20	33	VRT -
Signal Ground	7	7	Signal Ground
Internal Wire Connections			
Pin 4 > 5 (CTS +)		Pin 4 > 5 (CTS +)	
Pin 41 (VST +) > 45 (VTT +)		Pin 32 (VST +) > 40 (VTT +)	
Pin 16 (VST -) > 20 (VTT -)		Pin 31 (VST -) > 39 (VTT -)	
Pin 7 > 30 > 31 > 34		Pin 7 > 19 > 20 > 23	
Pin 13 > 38		Pin 13 > 28	
Pin 14 > 39		Pin 14 > 29	
Pin 46 > 47 > 48		Pin 41 > 42 > 43	

15-Pin to F RS-232-C Synchronous Pass-Through (Order No. 7941)



15-position D-sub plug with locking posts (ground shield connected to backshell)

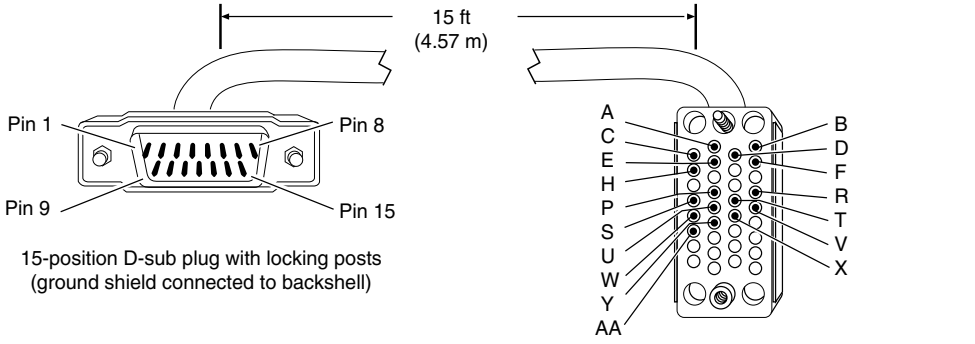
25-position D-sub receptacle with screw locks (ground shield connected to backshell)

CAB0079A

Industry Interface Type: RS-232-C

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Transmit Data	2	3	Receive Data
Receive Data	14	2	Transmit Data
Request to Send	6	8	Data Carrier Detect
Data Carrier Detect	10	4	Request to Send
Transmit Clock	4	15	Transmit Clock
Signal Ground	1	7	Signal Ground
Internal Wire Connections			
Pin 6 > 8		Pin 4 > 5	
Pin 3 > 4 > 12		Pin 15 > 17	
Pin 1 > 7		Pin 6 > 20	

15-Pin to F V.35 Synchronous Pass-Through (Order No. 7942)



15-position D-sub plug with locking posts
(ground shield connected to backshell)

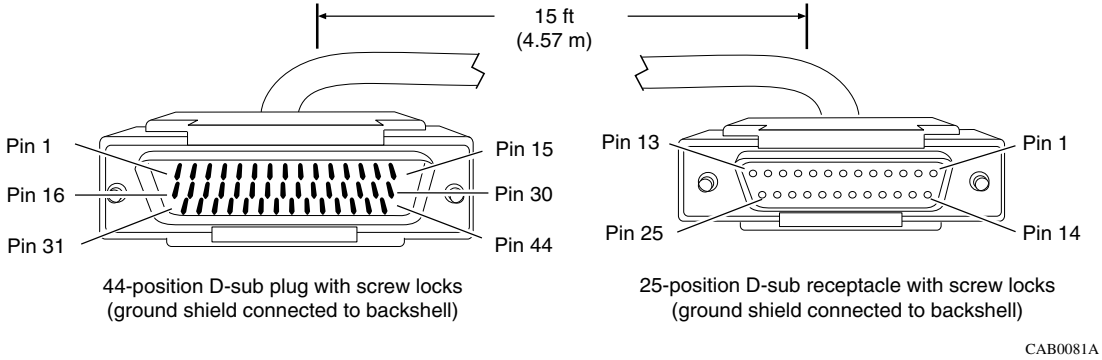
34-position V.35 receptacle with screw jack retainers
(ground shield connected to backshell)

CAB0080A

Industry Interface Type: V.35 (V.10 and V.11)

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Transmit Data +	2	R	Receive Data A
Transmit Data -	3	T	Receive Data B
Receive Data +	14	P	Transmit Data A
Receive Data -	13	S	Transmit Data B
Request to Send+	6	F	Data Carrier Detect
Data Carrier Detect +	10	D	Clear to Send
SCT +	4	Y	SCT A
SCT -	5	AA	SCT B
Signal Ground	1	B	Signal Ground
Internal Wire Connections			
Pin 1 > 7		Pin C > D	
Pin 6 > 8		Pin Y > V	
Pin 4 > 12		Pin AA > X	
Pin 5 > 11		Pin E > H	

44-Pin to F RS-232-C Synchronous Pass-Through (Order No. 7943)



44-position D-sub plug with screw locks
(ground shield connected to backshell)

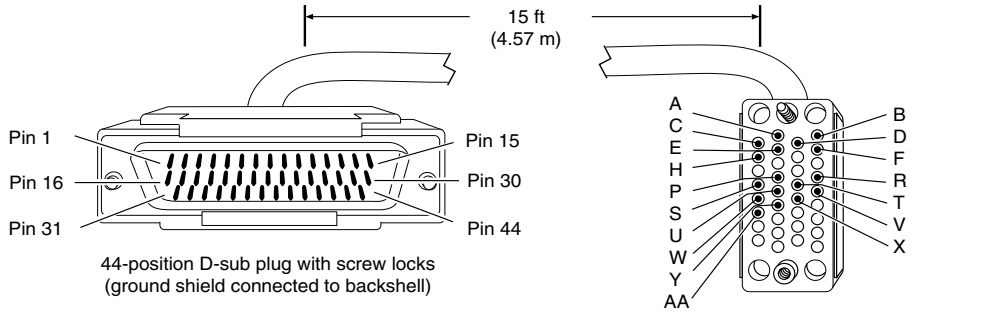
25-position D-sub receptacle with screw locks
(ground shield connected to backshell)

CAB0081A

Industry Interface Type: RS-232-C

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Send Data +	2	3	Receive Data
Receive Data +	3	2	Send Data
Request to Send +	4	8	Data Carrier Detect
Data Carrier Detect +	9	4	Request to Send
Send Timing +	10	15	Send Timing
Frame Ground	1	1	Frame Ground
Signal Ground	7	7	Signal Ground
Internal Wire Connections			
Pin 4 > 5		Pin 4 > 5	
Pin 10 > 11 > 12		Pin 15 > 17	
Pin 13 > 28		Pin 6 > 20	
Pin 14 > 29			
Pin 7 > 19 > 20			

44-Pin to F V.35 Synchronous Pass-Through (Order No. 7944)



44-position D-sub plug with screw locks
(ground shield connected to backshell)

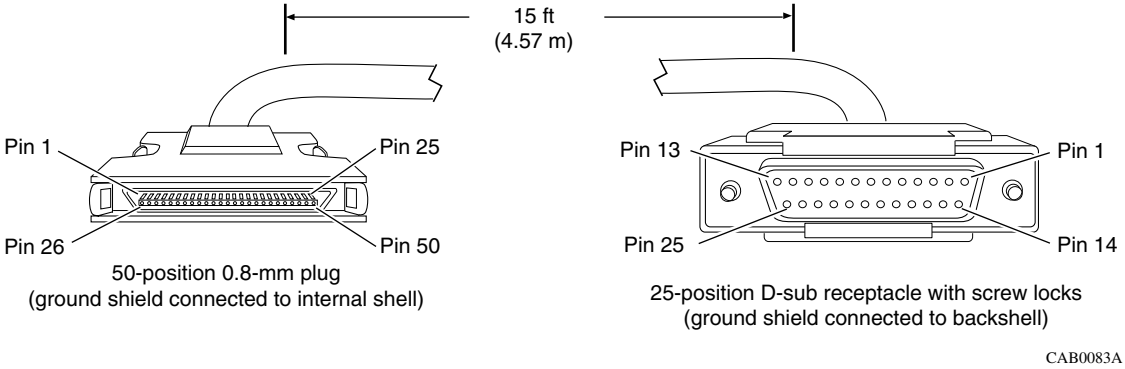
34-position V.35 receptacle with screw jack retainers
(ground shield connected to backshell)

CAB0082A

Industry Interface Type: V.35 (V.10 and V.11)

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
VSD +	38	R	Receive Data A
VSD -	36	T	Receive Data B
VRD +	37	P	Send Data A
VRD -	35	S	Send Data B
Request to Send +	4	F	Data Carrier Detect
Data Carrier Detect +	9	C	Request to Send
VTT +	40	Y	Send Timing A
VTT -	39	AA	Send Timing B
Frame Ground	1	A	Frame Ground
Signal Ground	7	B	Signal Ground
Internal Wire Connections			
Pin 4 > 5		Pin C > D	
Pin 32 > 34 > 40		Pin V > Y	
Pin 31 > 33 > 39		Pin X > AA	
Pin 13 > 28		Pin E > H	
Pin 14 > 29			
Pin 7 > 19 > 20 > 41 > 42			

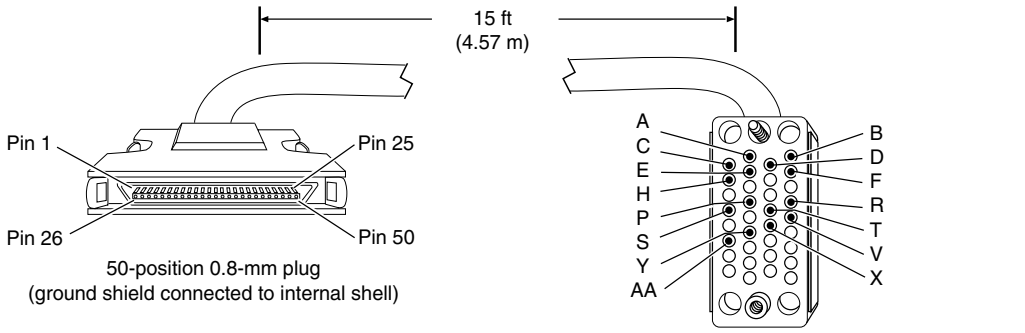
50-Pin to F RS-232-C Synchronous Pass-Through (Order No. 7945)



Industry Interface Type: RS-232-C

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Send Data +	2	3	Receive Data
Receive Data +	3	2	Send Data
Request to Send +	4	8	Data Carrier Detect
Data Carrier Detect +	9	4	Request to Send
Send Timing +	10	15	Send Timing
Frame Ground	1	1	Frame Ground
Signal Ground	7	7	Signal Ground
Internal Wire Connections			
Pin 4 > 5		Pin 4 > 5	
Pin 10 > 11 > 12		Pin 15 > 17	
Pin 13 > 38		Pin 6 > 20	
Pin 14 > 39			
Pin 7 > 30 > 31			

50-Pin to F V.35 Synchronous Pass-Through (Order No. 7946)

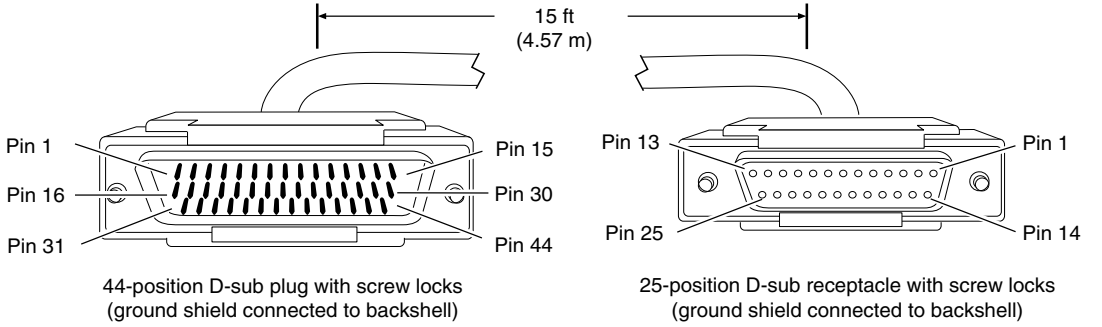


Industry Interface Type: V.35 (V.10 and V.11)

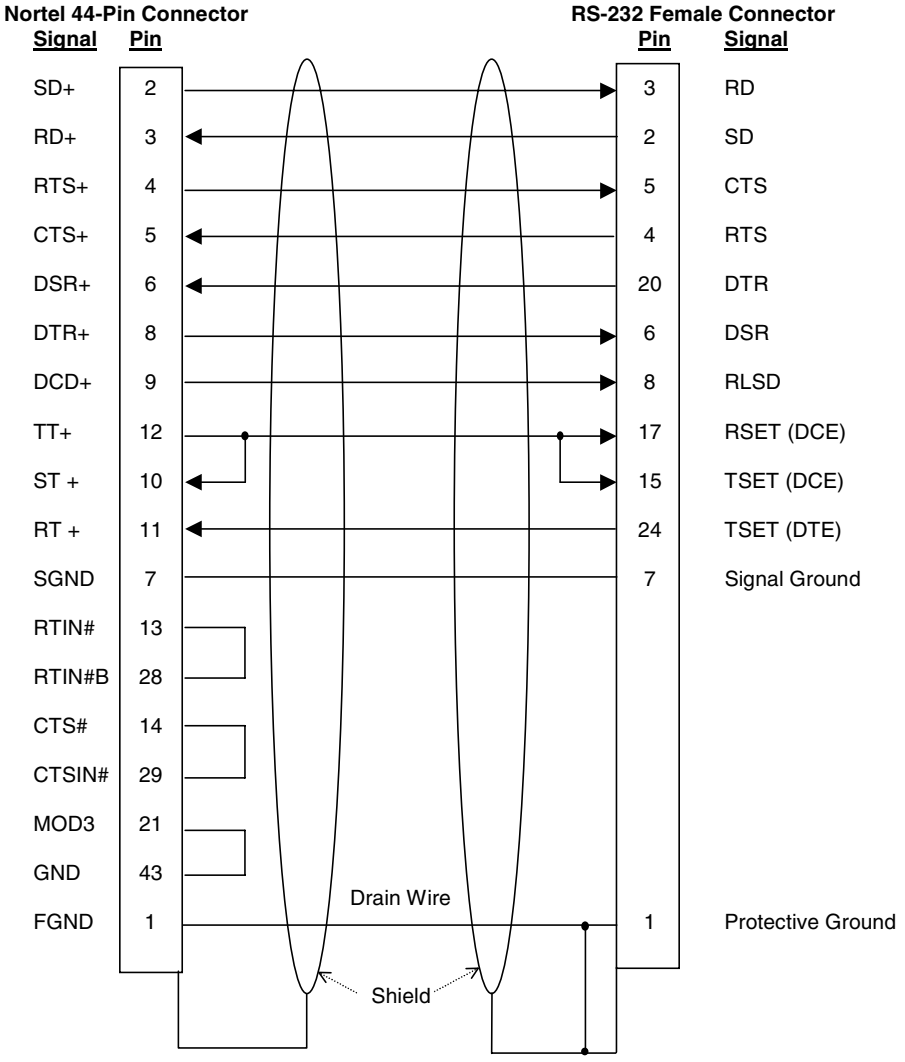
Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
VSD +	44	R	Receive Data A
VSD -	19	T	Receive Data B
VRD +	43	P	Send Data A
VRD -	18	S	Send Data B
Request to Send +	4	F	Data Carrier Detect
Data Carrier Detect +	9	D	Clear to Send
VTT +	45	Y	Send Timing A
VTT -	20	AA	Send Timing B
Frame Ground	1	A	Frame Ground
Signal Ground	7	B	Signal Ground
Internal Wire Connections			
Pin 4 > 5		Pin C > D	
Pin 41 > 42 > 45		Pin V > Y	
Pin 16 > 17 > 20		Pin X > AA	
Pin 13 > 38		Pin E > H	
Pin 14 > 39			
Pin 7 > 30 > 31 > 46 > 47			

44-Pin to F RS-232-C DCE (Order No. AA0018041)

Note: This cable provides the user with a female termination as a DCE device.

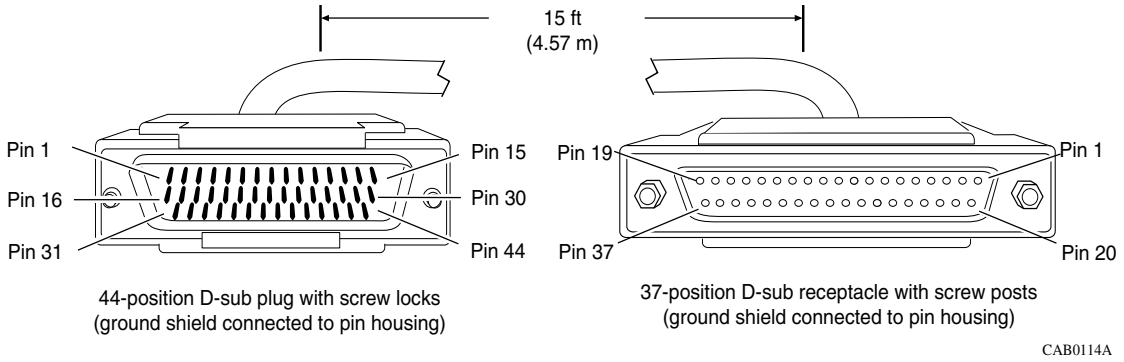


Industry Interface Type: RS-232-C



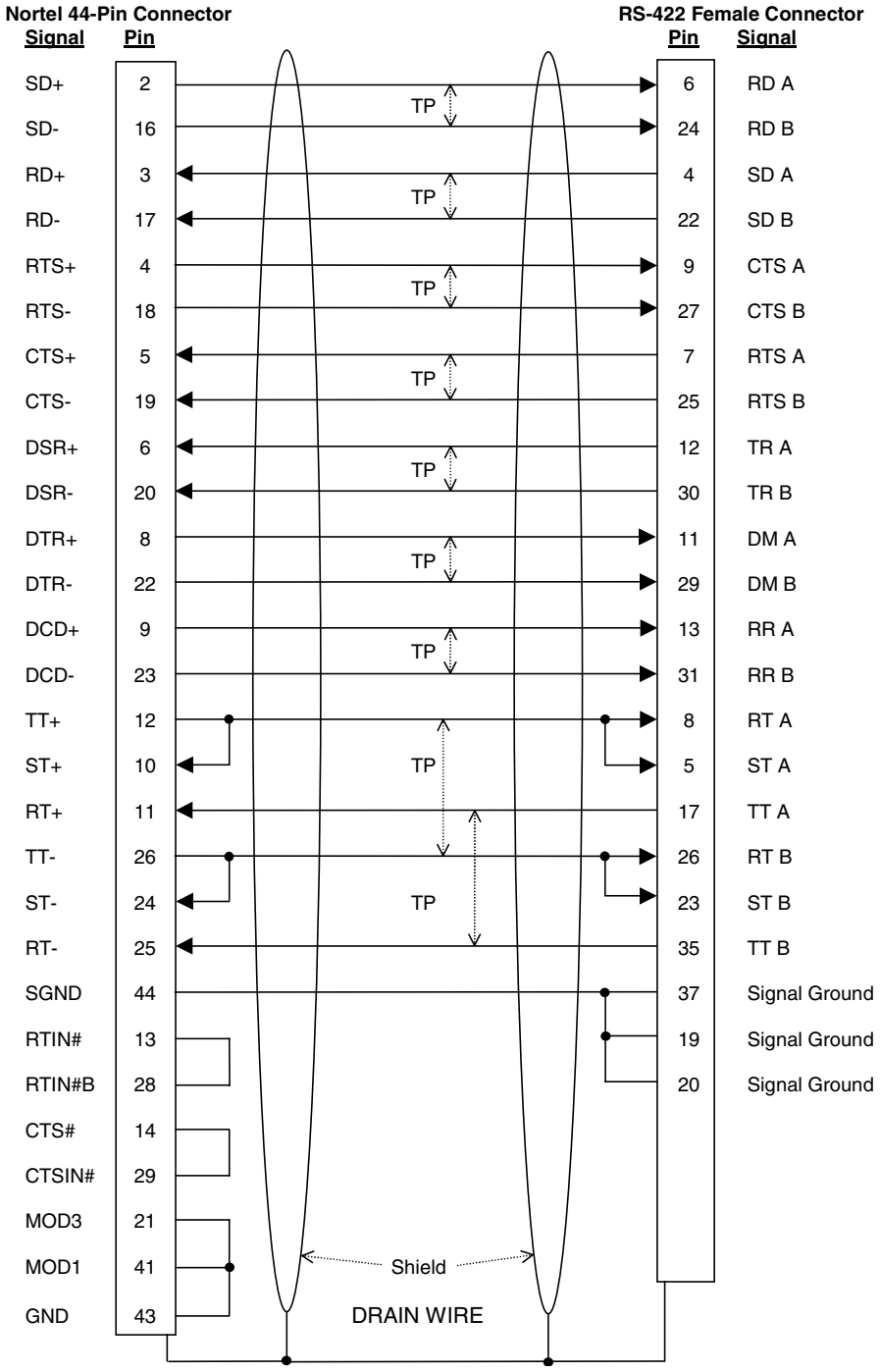
Note: Connections are individual conductors, **not twisted pair**.

44-Pin to F RS-422 DCE (Order No. AA0018042)

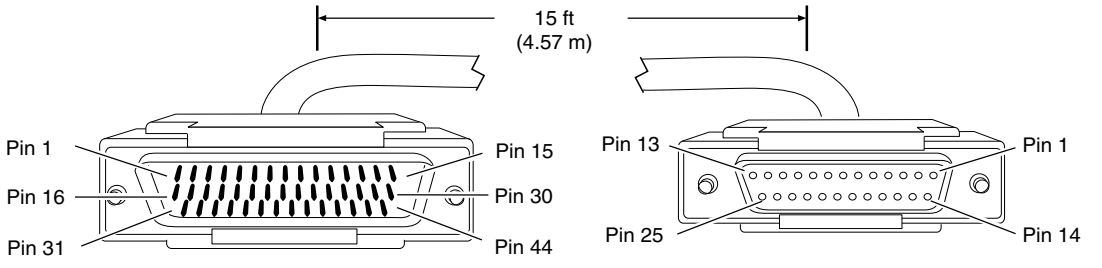


Industry Interface Type: RS-422

Note: Connections marked TP are twisted pair.


Nortel 44-Pin Connector
Signal
Pin
SD+ 2
SD- 16
RD+ 3
RD- 17
RTS+ 4
RTS- 18
CTS+ 5
CTS- 19
DSR+ 6
DSR- 20
DTR+ 8
DTR- 22
DCD+ 9
DCD- 23
TT+ 12
ST+ 10
RT+ 11
TT- 26
ST- 24
RT- 25
SGND 44
RTIN# 13
RTIN#B 28
CTS# 14
CTSIN# 29
MOD3 21
MOD1 41
GND 43
TP
Shield
DRAIN WIRE
RS-422 Female Connector
Pin
Signal
6 RD A
24 RD B
4 SD A
22 SD B
9 CTS A
27 CTS B
7 RTS A
25 RTS B
12 TR A
30 TR B
11 DM A
29 DM B
13 RR A
31 RR B
8 RT A
5 ST A
17 TT A
26 RT B
23 ST B
35 TT B
37 Signal Ground
19 Signal Ground
20 Signal Ground

44-Pin to F RS-530 DCE (Order No. AA0018043)



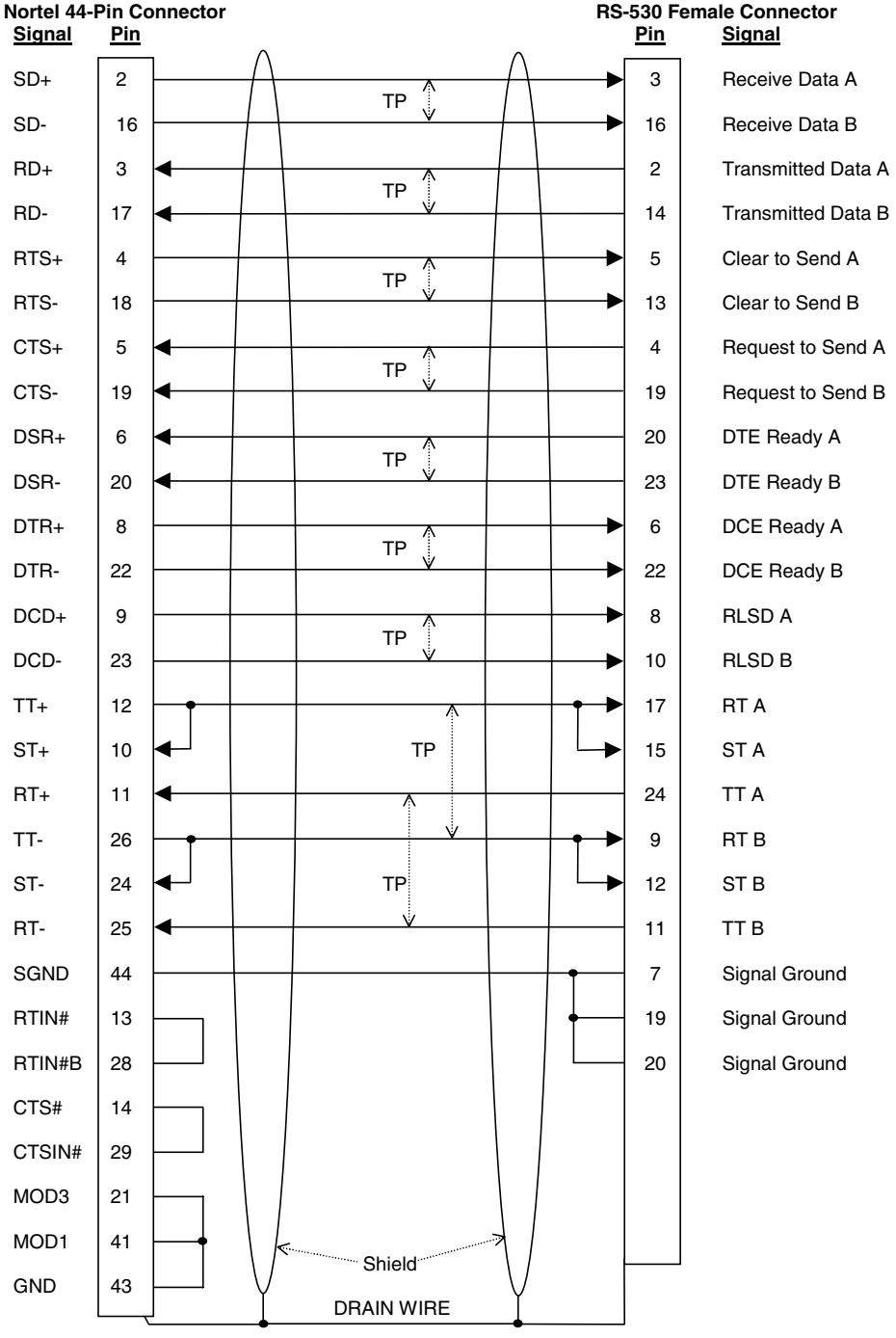
44-position D-sub plug with screw locks
(ground shield connected to backshell)

25-position D-sub receptacle with screw locks
(ground shield connected to backshell)

CAB0081A

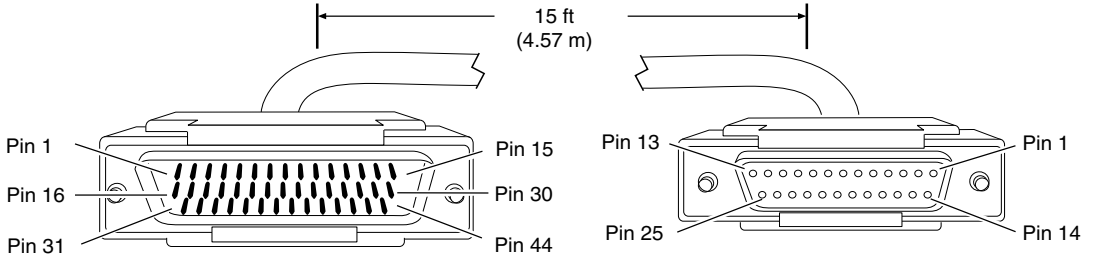
Industry Interface Type: RS-530

Note: Connections marked TP are twisted pair.


Nortel 44-Pin Connector
Signal
Pin
RS-530 Female Connector
Pin
Signal
SD+ 2
SD- 16
RD+ 3
RD- 17
RTS+ 4
RTS- 18
CTS+ 5
CTS- 19
DSR+ 6
DSR- 20
DTR+ 8
DTR- 22
DCD+ 9
DCD- 23
TT+ 12
ST+ 10
RT+ 11
TT- 26
ST- 24
RT- 25
SGND 44
RTIN# 13
RTIN#B 28
CTS# 14
CTSIN# 29
MOD3 21
MOD1 41
GND 43
TP
3 Receive Data A
16 Receive Data B
2 Transmitted Data A
14 Transmitted Data B
5 Clear to Send A
13 Clear to Send B
4 Request to Send A
19 Request to Send B
20 DTE Ready A
23 DTE Ready B
6 DCE Ready A
22 DCE Ready B
8 RLSD A
10 RLSD B
17 RT A
15 ST A
24 TT A
9 RT B
12 ST B
11 TT B
7 Signal Ground
19 Signal Ground
20 Signal Ground
Shield
DRAIN WIRE

44-Pin to F V.28 DCE (Order No. AA0018044)

Note: This cable provides the user with a female termination as a DCE device.

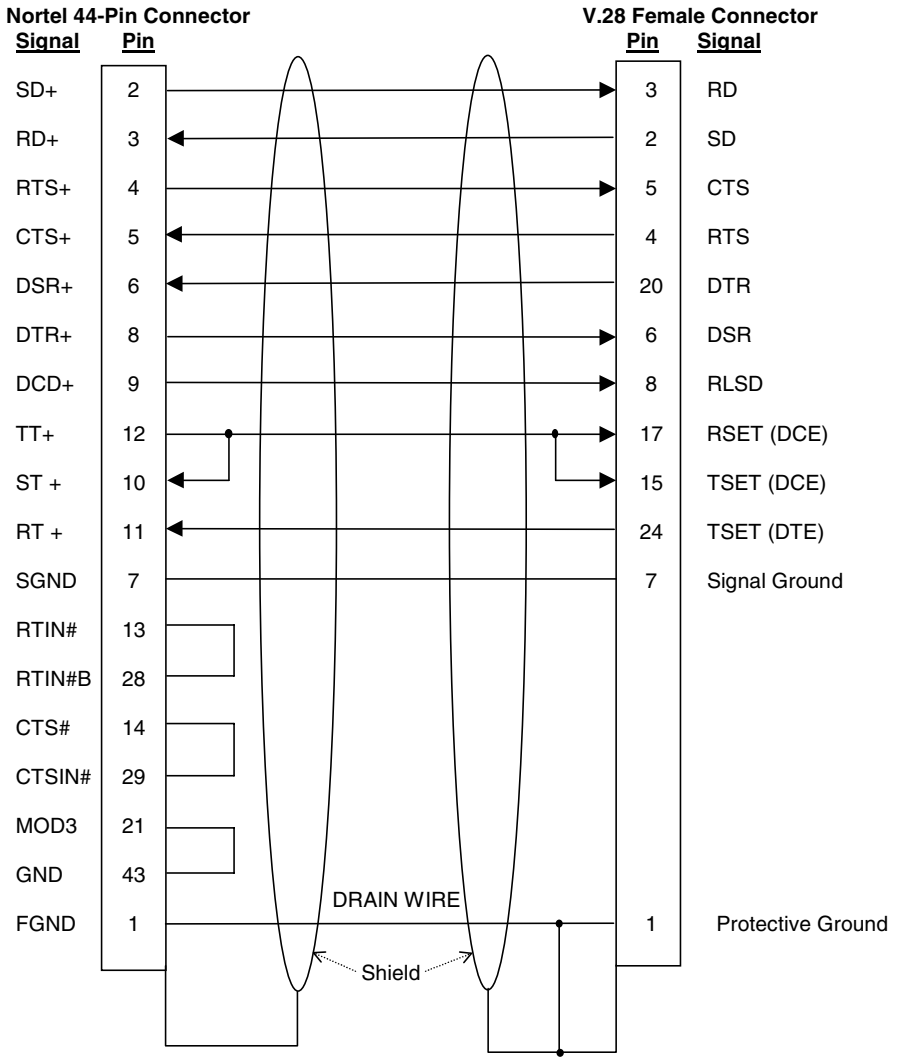


44-position D-sub plug with screw locks
(ground shield connected to backshell)

25-position D-sub receptacle with screw locks
(ground shield connected to backshell)

CAB0081A

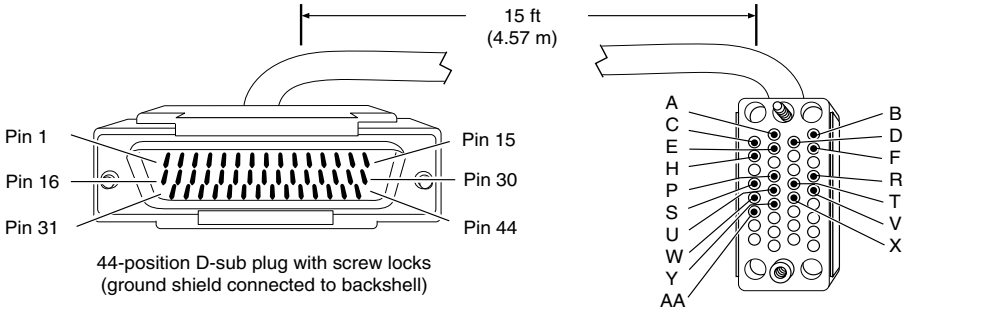
Industry Interface Type: V.28



Note: Connections are individual conductors, **not twisted pair**.

44-Pin to F V.35 DCE (Order No. AA0018045)

Note: This cable provides the user with a female termination as a DCE device.



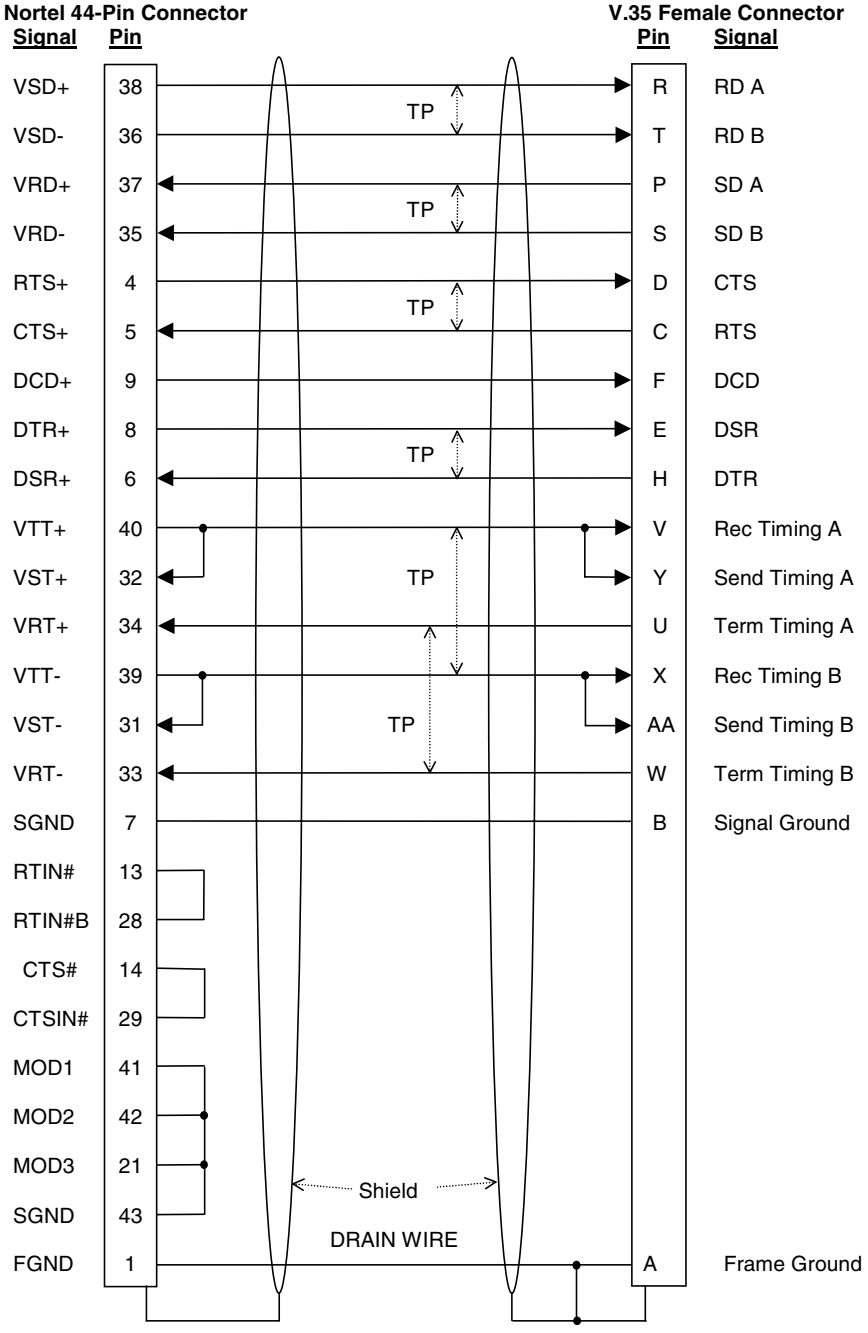
44-position D-sub plug with screw locks
(ground shield connected to backshell)

34-position V.35 receptacle with screw jack retainers
(ground shield connected to backshell)

CAB0082A

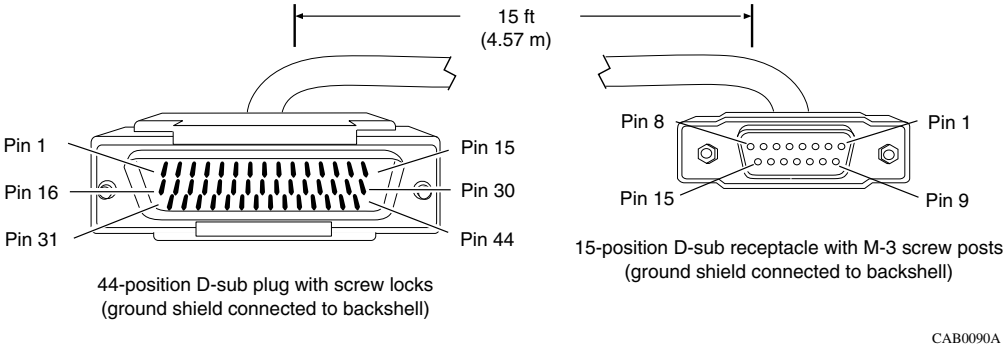
Industry Interface Type: V.35

Note: Connections marked TP are twisted pair.


Nortel 44-Pin Connector
Signal
Pin
V.35 Female Connector
Pin
Signal
VSD+ 38
VSD- 36
VRD+ 37
VRD- 35
RTS+ 4
CTS+ 5
DCD+ 9
DTR+ 8
DSR+ 6
VTT+ 40
VST+ 32
VRT+ 34
VTT- 39
VST- 31
VRT- 33
SGND 7
RTIN# 13
RTIN#B 28
CTS# 14
CTSIN# 29
MOD1 41
MOD2 42
MOD3 21
SGND 43
FGND 1
TP
TP
TP
TP
TP
TP
R RD A
T RD B
P SD A
S SD B
D CTS
C RTS
F DCD
E DSR
H DTR
V Rec Timing A
Y Send Timing A
U Term Timing A
X Rec Timing B
AA Send Timing B
W Term Timing B
B Signal Ground
Shield
DRAIN WIRE
A Frame Ground

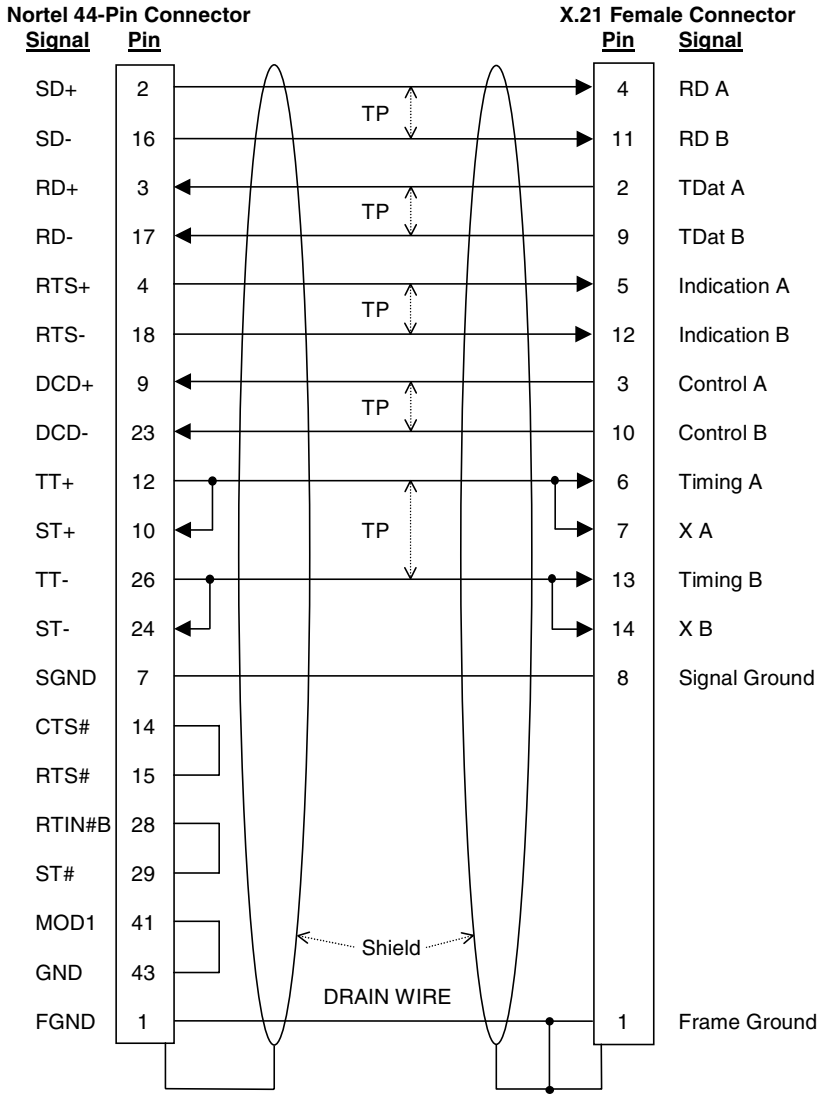
44-Pin to F X.21 DCE (Order No. AA0018046)

Note: This cable provides the user with a female termination as a DCE device.

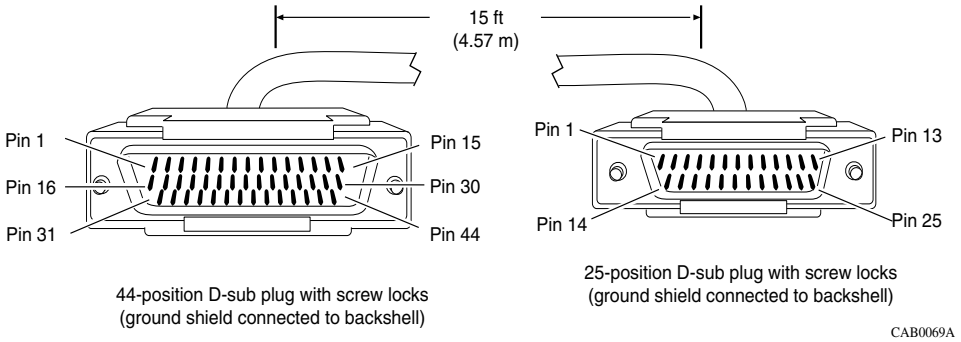


Industry Interface Type: X.21

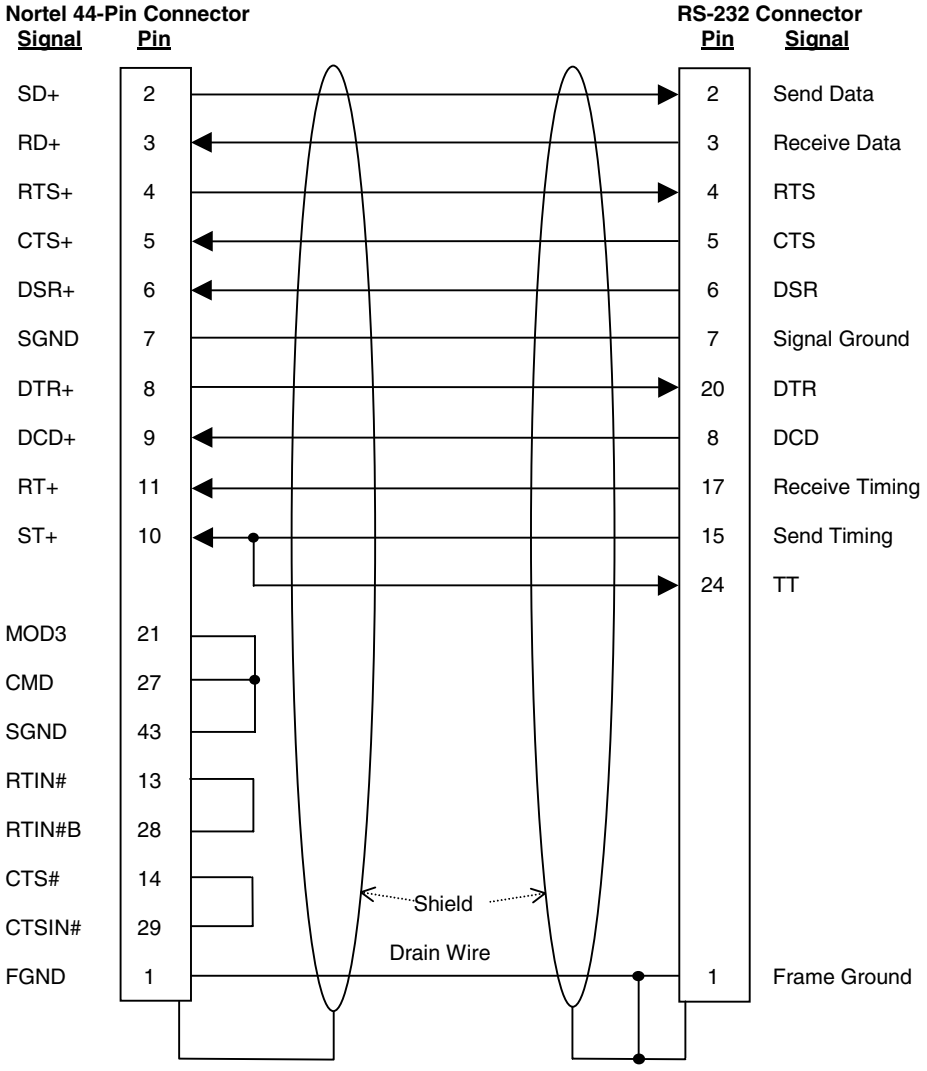
Note: Connections marked TP are twisted pair.


Nortel 44-Pin Connector
Signal
Pin
X.21 Female Connector
Pin
Signal
SD+ 2
SD- 16
RD+ 3
RD- 17
RTS+ 4
RTS- 18
DCD+ 9
DCD- 23
TT+ 12
ST+ 10
TT- 26
ST- 24
SGND 7
CTS# 14
RTS# 15
RTIN#B 28
ST# 29
MOD1 41
GND 43
FGND 1
TP
TP
TP
TP
TP
Shield
DRAIN WIRE
4 RD A
11 RD B
2 TDat A
9 TDat B
5 Indication A
12 Indication B
3 Control A
10 Control B
6 Timing A
7 X A
13 Timing B
14 X B
8 Signal Ground
1 Frame Ground

44-Pin to RS-232-C Loop Timing (Order No. AA0018048)

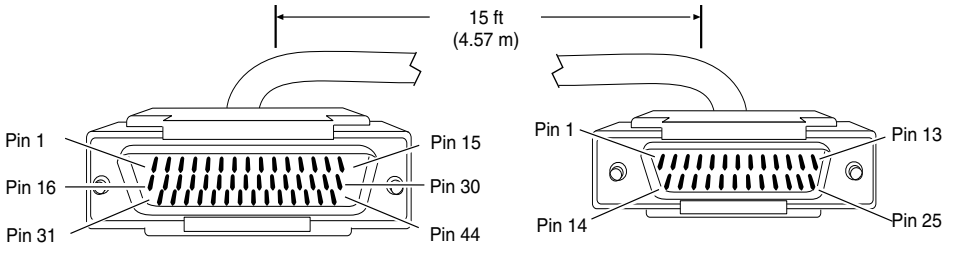


Industry Interface Type: RS-232-C



Note: Connections are individual conductors, **not twisted pair**.

44-Pin to RS-232-C Standard (Order No. AA0018049)

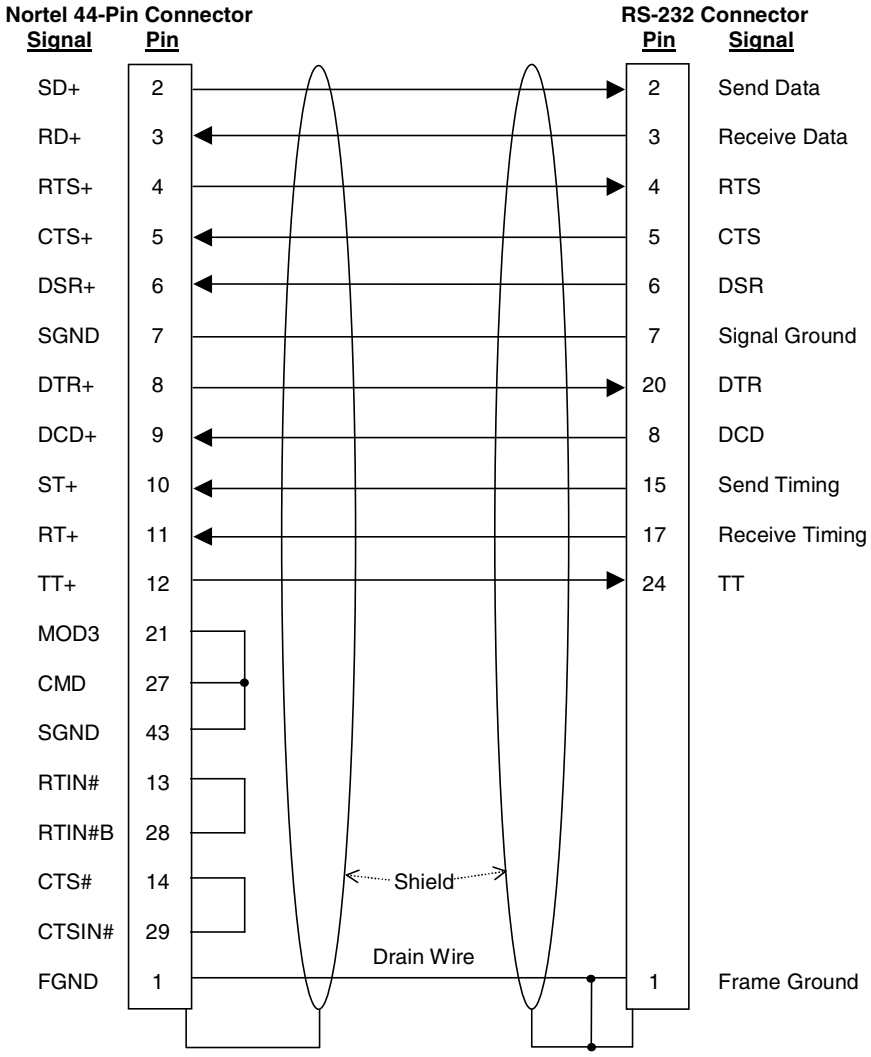


44-position D-sub plug with screw locks
(ground shield connected to backshell)

25-position D-sub plug with screw locks
(ground shield connected to backshell)

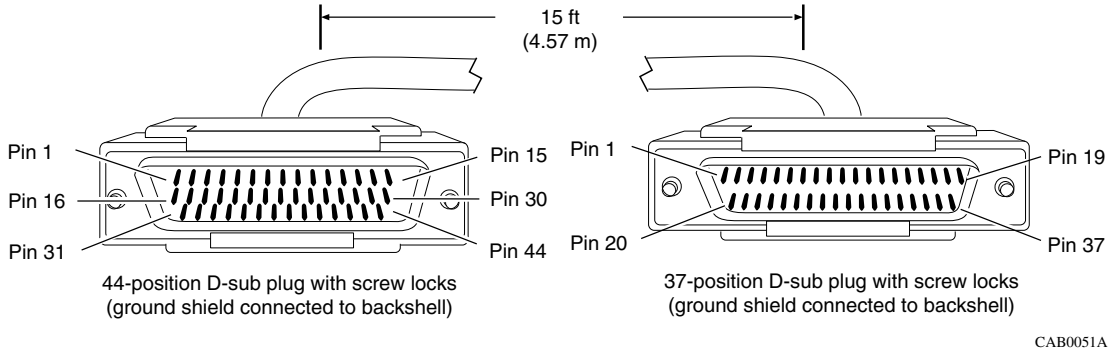
CAB0069A

Industry Interface Type: RS-232-C



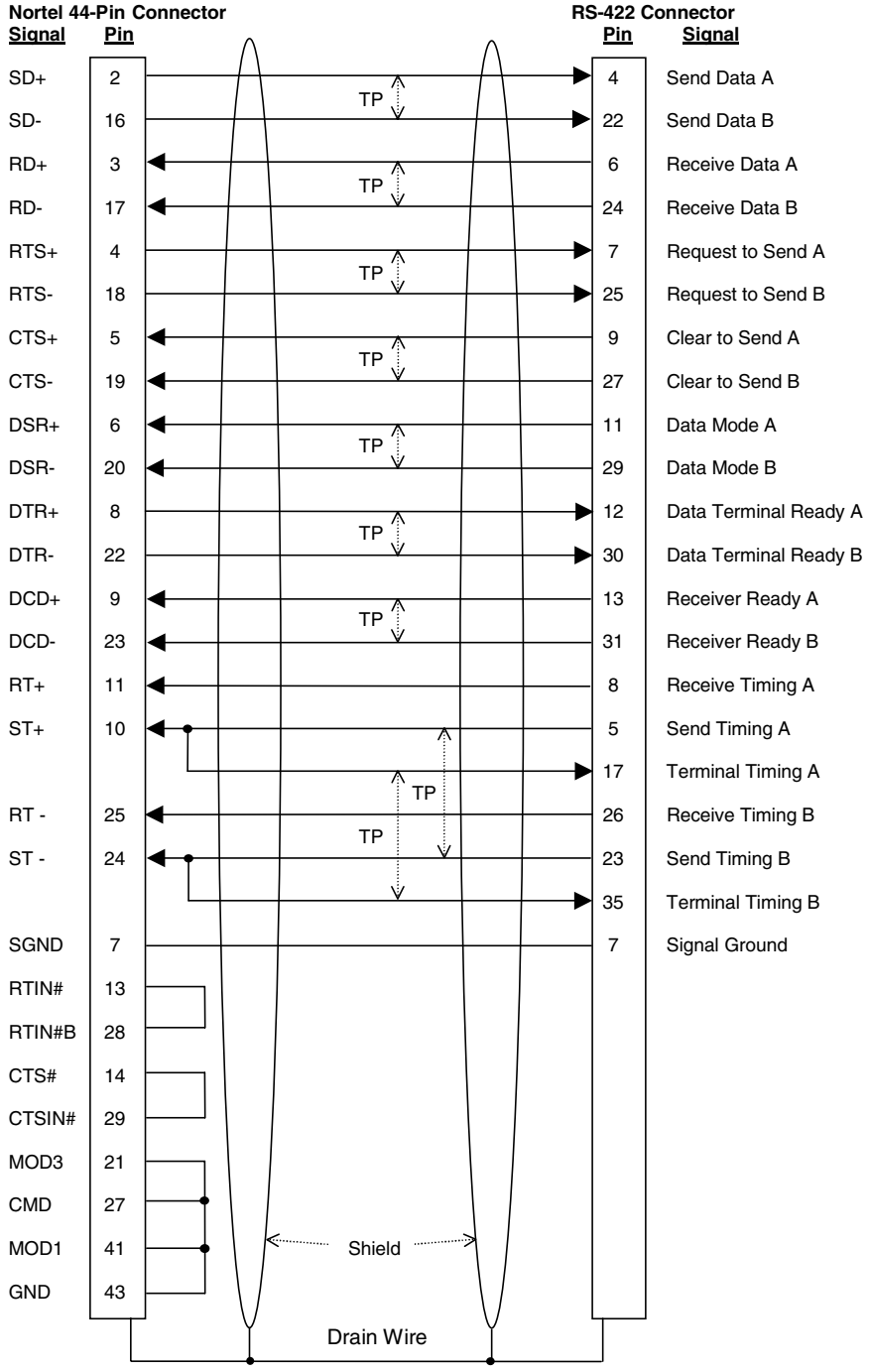
Note: Connections are individual conductors, **not twisted pair**.

44-Pin to RS-422 Loop Timing (Order No. AA0018051)

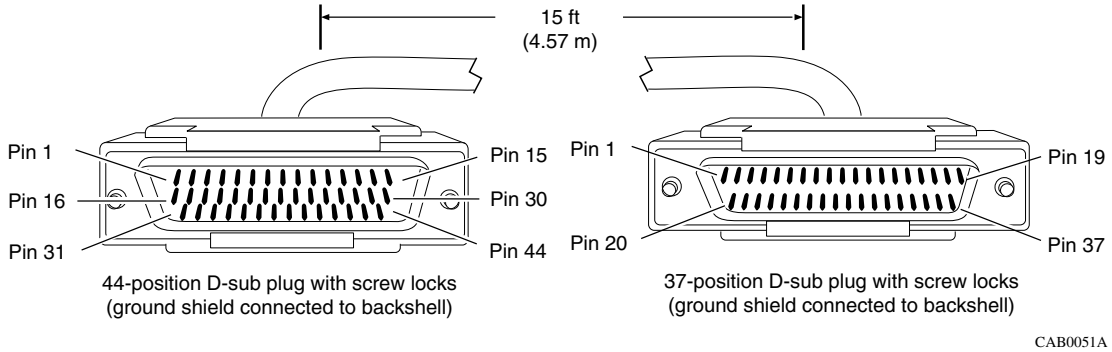


Industry Interface Type: RS-422

Note: Connections marked TP are twisted pair.

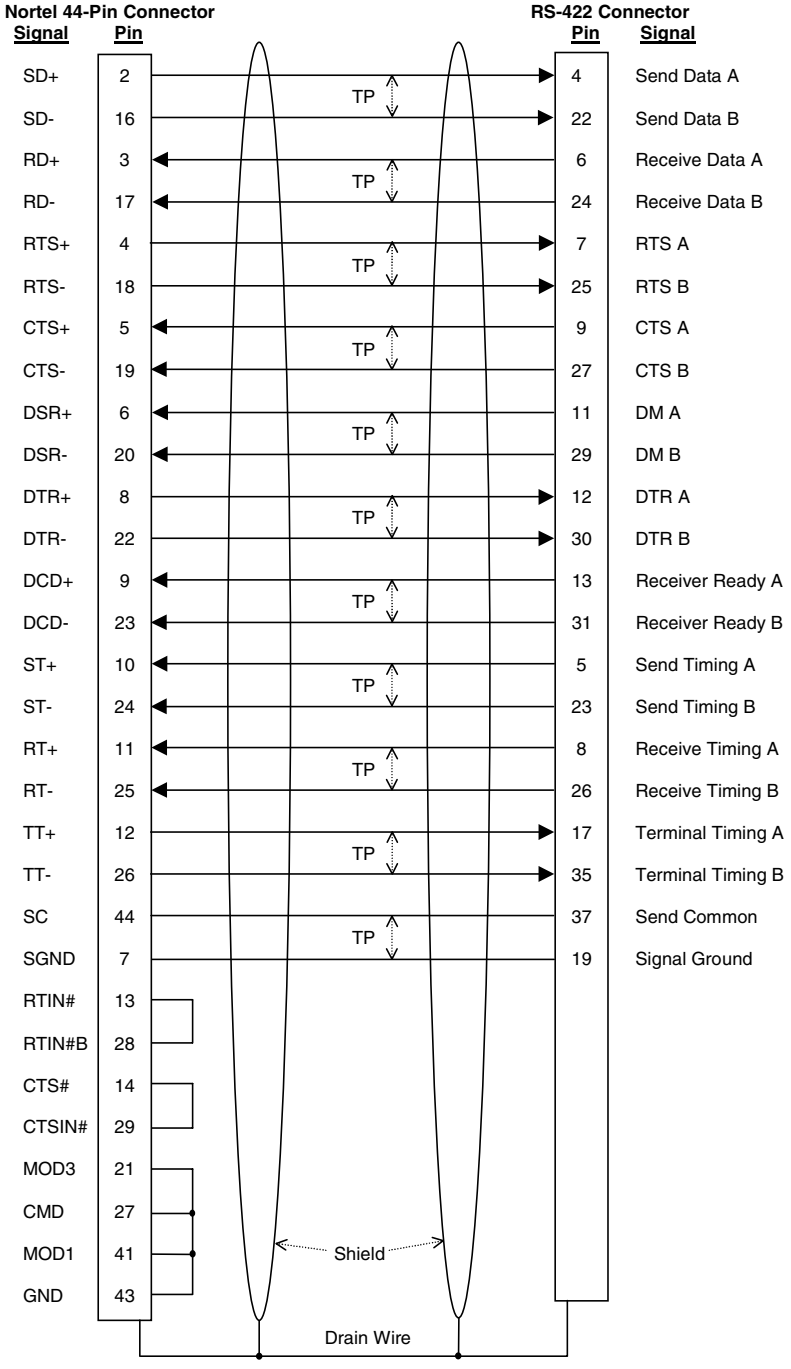

Nortel 44-Pin Connector
Signal
Pin
RS-422 Connector
Pin
Signal
SD+ 2 4 Send Data A
SD- 16 22 Send Data B
RD+ 3 6 Receive Data A
RD- 17 24 Receive Data B
RTS+ 4 7 Request to Send A
RTS- 18 25 Request to Send B
CTS+ 5 9 Clear to Send A
CTS- 19 27 Clear to Send B
DSR+ 6 11 Data Mode A
DSR- 20 29 Data Mode B
DTR+ 8 12 Data Terminal Ready A
DTR- 22 30 Data Terminal Ready B
DCD+ 9 13 Receiver Ready A
DCD- 23 31 Receiver Ready B
RT+ 11 8 Receive Timing A
ST+ 10 5 Send Timing A
17 Terminal Timing A
RT - 25 26 Receive Timing B
ST - 24 23 Send Timing B
35 Terminal Timing B
SGND 7 7 Signal Ground
RTIN# 13
RTIN#B 28
CTS# 14
CTSIN# 29
MOD3 21
CMD 27
MOD1 41
GND 43
TP
Shield
Drain Wire

44-Pin to RS-422 Standard (Order No. AA0018052)

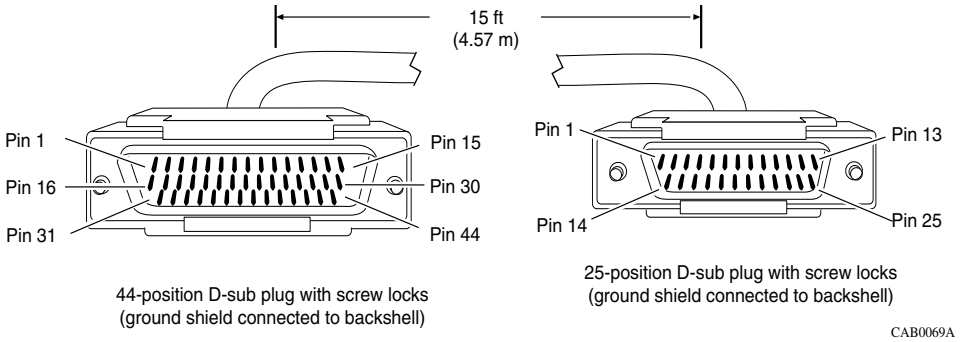


Industry Interface Type: RS-422

Note: Connections marked TP are twisted pair.

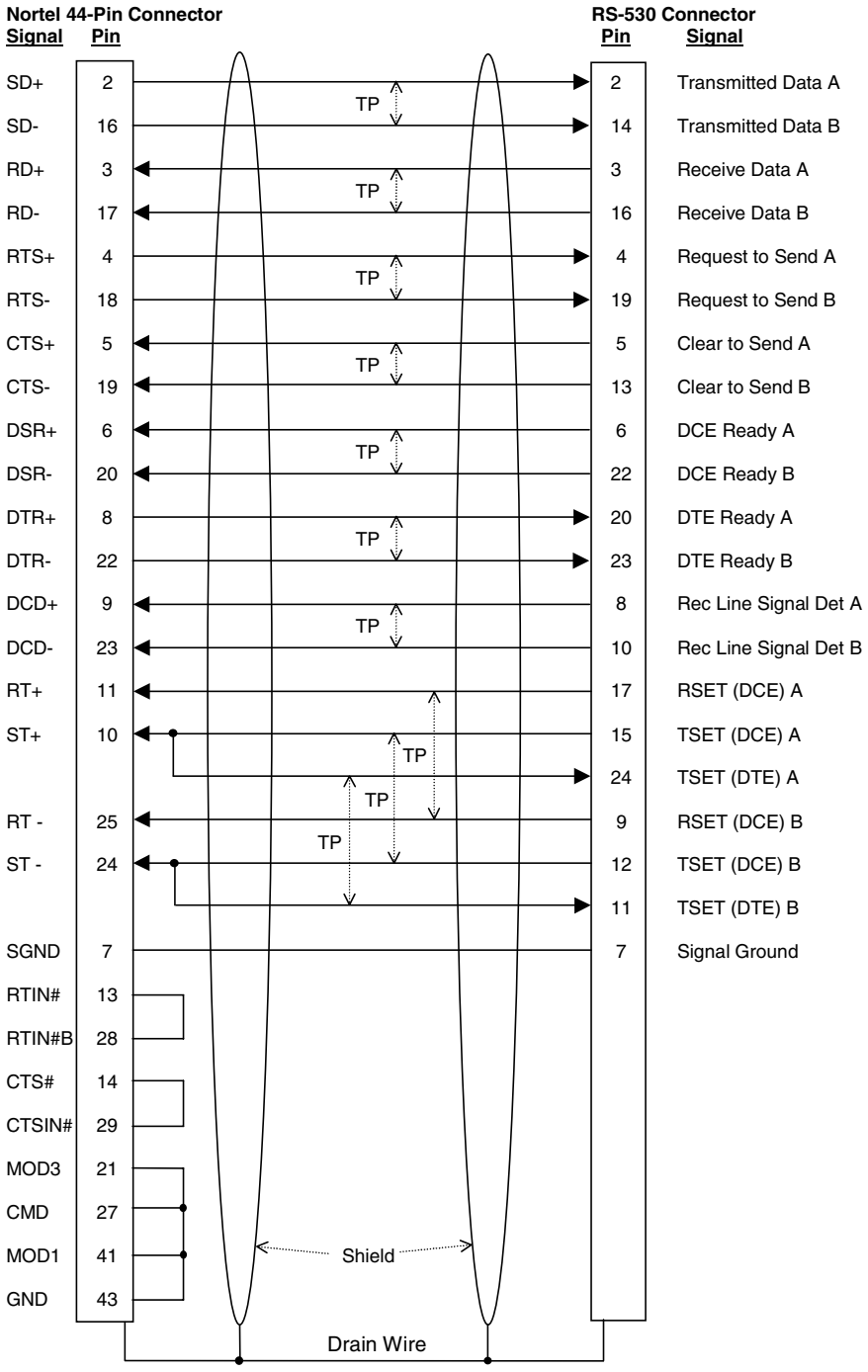

Nortel 44-Pin Connector
Signal
Pin
RS-422 Connector
Pin
Signal
SD+ 2
SD- 16
RD+ 3
RD- 17
RTS+ 4
RTS- 18
CTS+ 5
CTS- 19
DSR+ 6
DSR- 20
DTR+ 8
DTR- 22
DCD+ 9
DCD- 23
ST+ 10
ST- 24
RT+ 11
RT- 25
TT+ 12
TT- 26
SC 44
SGND 7
RTIN# 13
RTIN#B 28
CTS# 14
CTSIN# 29
MOD3 21
CMD 27
MOD1 41
GND 43
TP
4 Send Data A
22 Send Data B
6 Receive Data A
24 Receive Data B
7 RTS A
25 RTS B
9 CTS A
27 CTS B
11 DM A
29 DM B
12 DTR A
30 DTR B
13 Receiver Ready A
31 Receiver Ready B
5 Send Timing A
23 Send Timing B
8 Receive Timing A
26 Receive Timing B
17 Terminal Timing A
35 Terminal Timing B
37 Send Common
19 Signal Ground
Shield
Drain Wire

44-Pin to RS-530 Loop Timing (Order No. AA0018053)

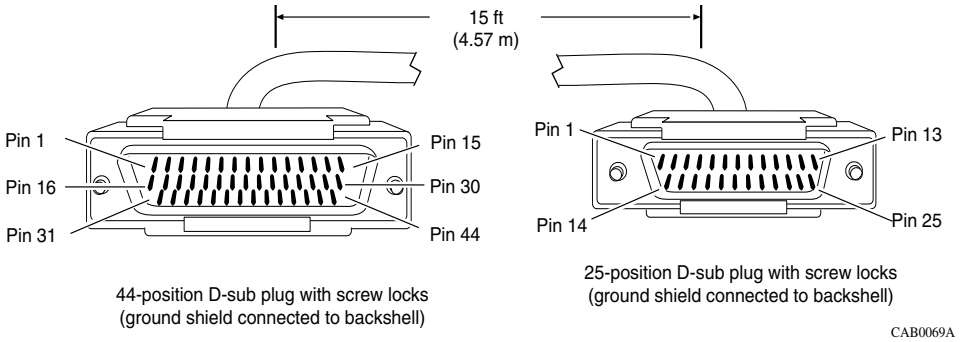


Industry Interface Type: RS-530

Note: Connections marked TP are twisted pair.

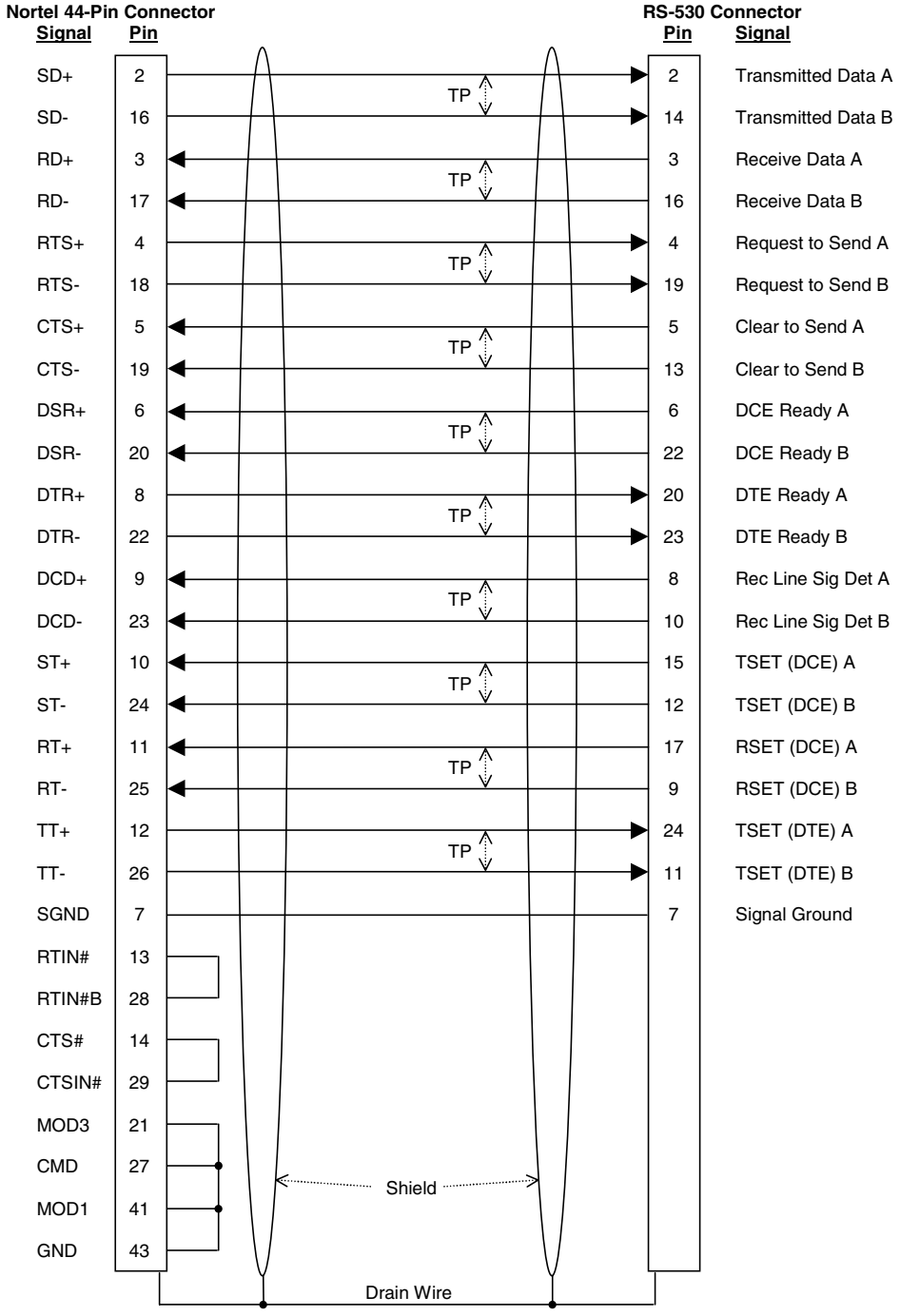

Nortel 44-Pin Connector
Signal Pin
RS-530 Connector
Pin Signal
SD+ 2
SD- 16
RD+ 3
RD- 17
RTS+ 4
RTS- 18
CTS+ 5
CTS- 19
DSR+ 6
DSR- 20
DTR+ 8
DTR- 22
DCD+ 9
DCD- 23
RT+ 11
ST+ 10
RT - 25
ST - 24
SGND 7
RTIN# 13
RTIN#B 28
CTS# 14
CTSIN# 29
MOD3 21
CMD 27
MOD1 41
GND 43
TP
Shield
Drain Wire
2 Transmitted Data A
14 Transmitted Data B
3 Receive Data A
16 Receive Data B
4 Request to Send A
19 Request to Send B
5 Clear to Send A
13 Clear to Send B
6 DCE Ready A
22 DCE Ready B
20 DTE Ready A
23 DTE Ready B
8 Rec Line Signal Det A
10 Rec Line Signal Det B
17 RSET (DCE) A
15 TSET (DCE) A
24 TSET (DTE) A
9 RSET (DCE) B
12 TSET (DCE) B
11 TSET (DTE) B
7 Signal Ground

44-Pin to RS-530 Standard (Order No. AA0018054)

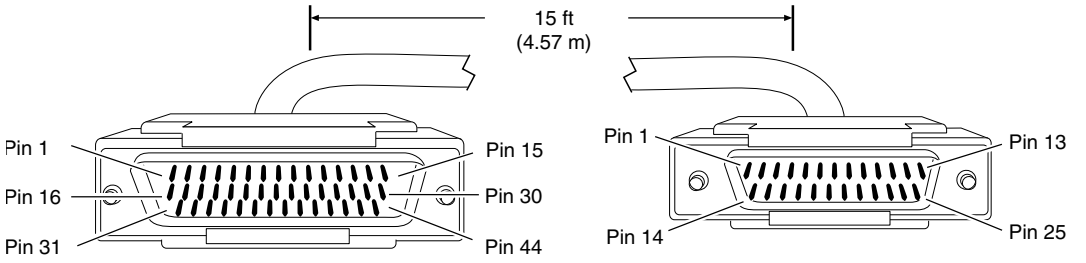


Industry Interface Type: RS-530

Note: Connections marked TP are twisted pair.


Nortel 44-Pin Connector
Signal
Pin
RS-530 Connector
Pin
Signal
SD+ 2
SD- 16
RD+ 3
RD- 17
RTS+ 4
RTS- 18
CTS+ 5
CTS- 19
DSR+ 6
DSR- 20
DTR+ 8
DTR- 22
DCD+ 9
DCD- 23
ST+ 10
ST- 24
RT+ 11
RT- 25
TT+ 12
TT- 26
SGND 7
RTIN# 13
RTIN#B 28
CTS# 14
CTSIN# 29
MOD3 21
CMD 27
MOD1 41
GND 43
TP
2 Transmitted Data A
14 Transmitted Data B
3 Receive Data A
16 Receive Data B
4 Request to Send A
19 Request to Send B
5 Clear to Send A
13 Clear to Send B
6 DCE Ready A
22 DCE Ready B
20 DTE Ready A
23 DTE Ready B
8 Rec Line Sig Det A
10 Rec Line Sig Det B
15 TSET (DCE) A
12 TSET (DCE) B
17 RSET (DCE) A
9 RSET (DCE) B
24 TSET (DTE) A
11 TSET (DTE) B
7 Signal Ground
Shield
Drain Wire

44-Pin to V.28 Loop Timing (Order No. AA0018056)



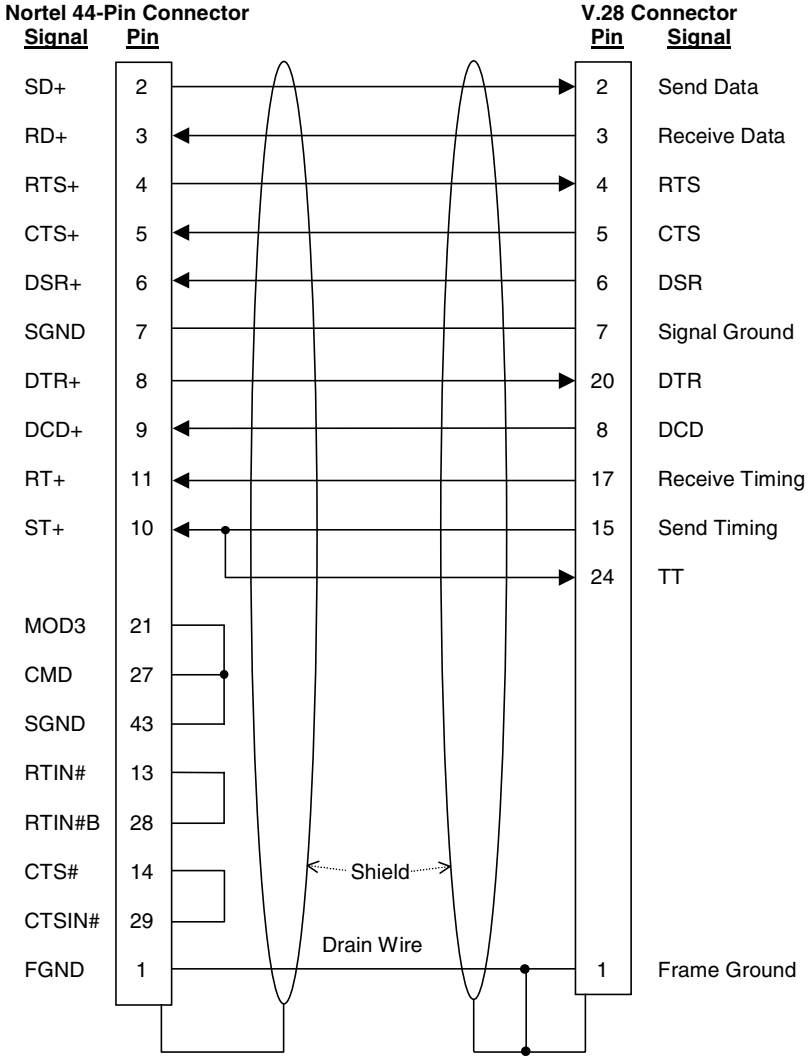
44-position D-sub plug with screw locks
(ground shield connected to backshell)

25-position D-sub plug with M-3 jack screws
(ground shield connected to backshell)

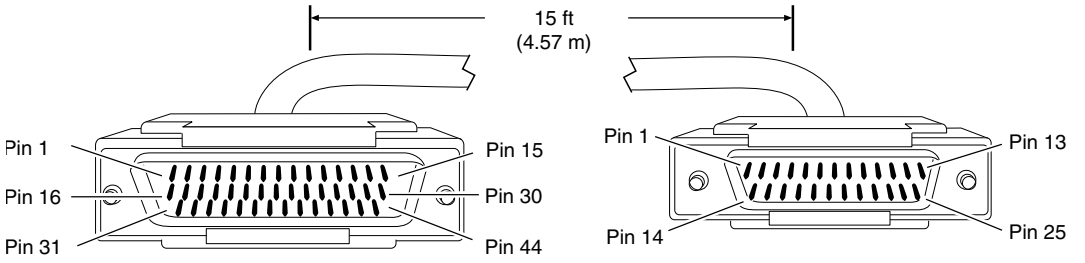
CAB0069B

Industry Interface Type: V.28

Note: Connections are individual conductors, **not twisted pair**.


Nortel 44-Pin Connector
Signal
Pin
V.28 Connector
Pin
Signal
SD+ 2
RD+ 3
RTS+ 4
CTS+ 5
DSR+ 6
SGND 7
DTR+ 8
DCD+ 9
RT+ 11
ST+ 10
MOD3 21
CMD 27
SGND 43
RTIN# 13
RTIN#B 28
CTS# 14
CTSIN# 29
FGND 1
2 Send Data
3 Receive Data
4 RTS
5 CTS
6 DSR
7 Signal Ground
20 DTR
8 DCD
17 Receive Timing
15 Send Timing
24 TT
1 Frame Ground
Shield
Drain Wire

44-Pin to V.28 Standard (Order No. AA0018057)



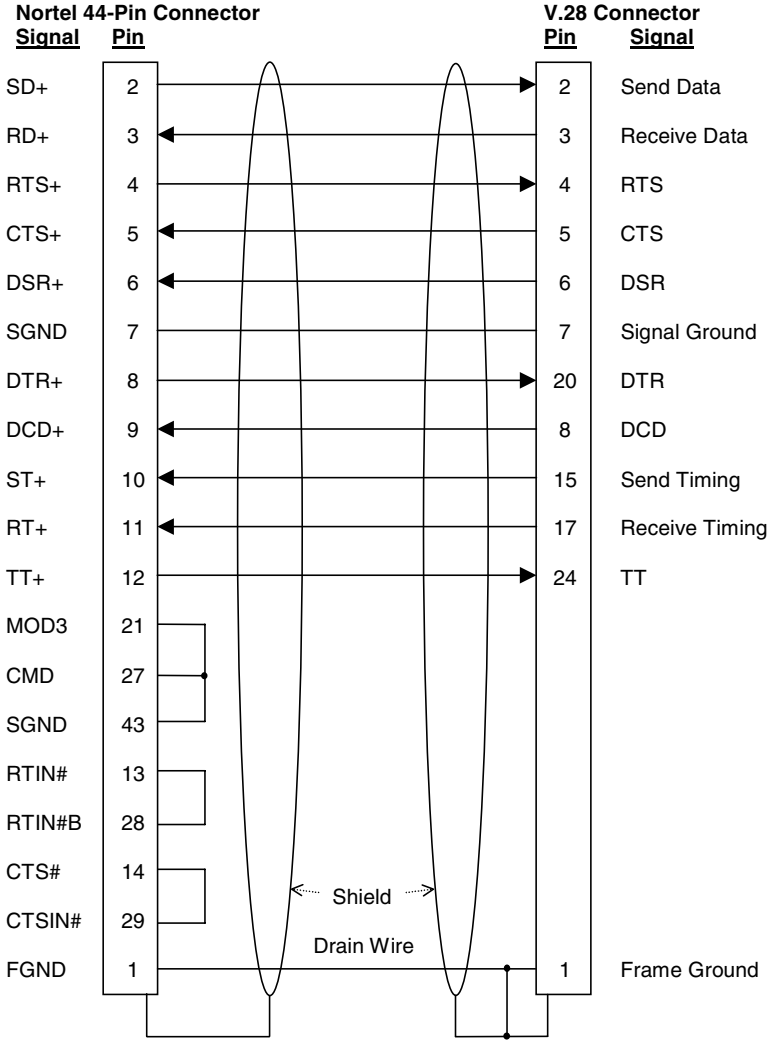
44-position D-sub plug with screw locks
(ground shield connected to backshell)

25-position D-sub plug with M-3 jack screws
(ground shield connected to backshell)

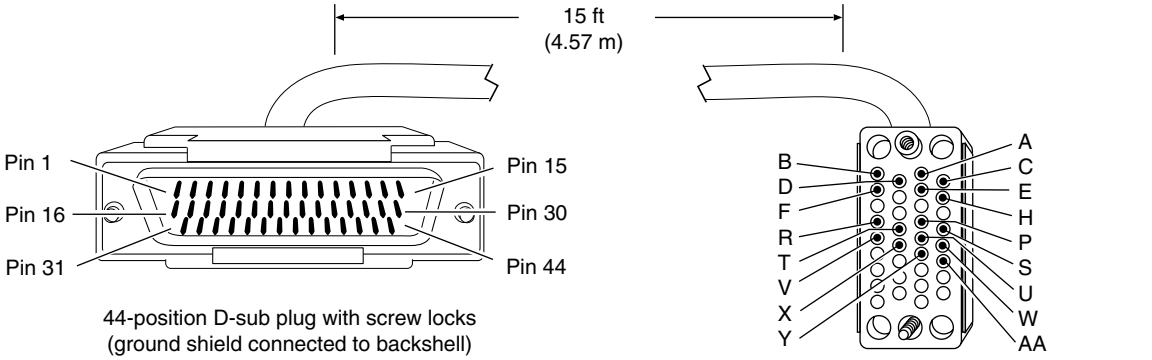
CAB0069B

Industry Interface Type: V.28

Note: Connections are individual conductors, **not twisted pair**.


Nortel 44-Pin Connector
Signal
Pin
V.28 Connector
Pin
Signal
SD+ 2 2 Send Data
RD+ 3 3 Receive Data
RTS+ 4 4 RTS
CTS+ 5 5 CTS
DSR+ 6 6 DSR
SGND 7 7 Signal Ground
DTR+ 8 20 DTR
DCD+ 9 8 DCD
ST+ 10 15 Send Timing
RT+ 11 17 Receive Timing
TT+ 12 24 TT
MOD3 21
CMD 27
SGND 43
RTIN# 13
RTIN#B 28
CTS# 14
CTSIN# 29
Shield
Drain Wire
FGND 1 1 Frame Ground

44-Pin to V.35 Loop Timing (Order No. AA0018059)



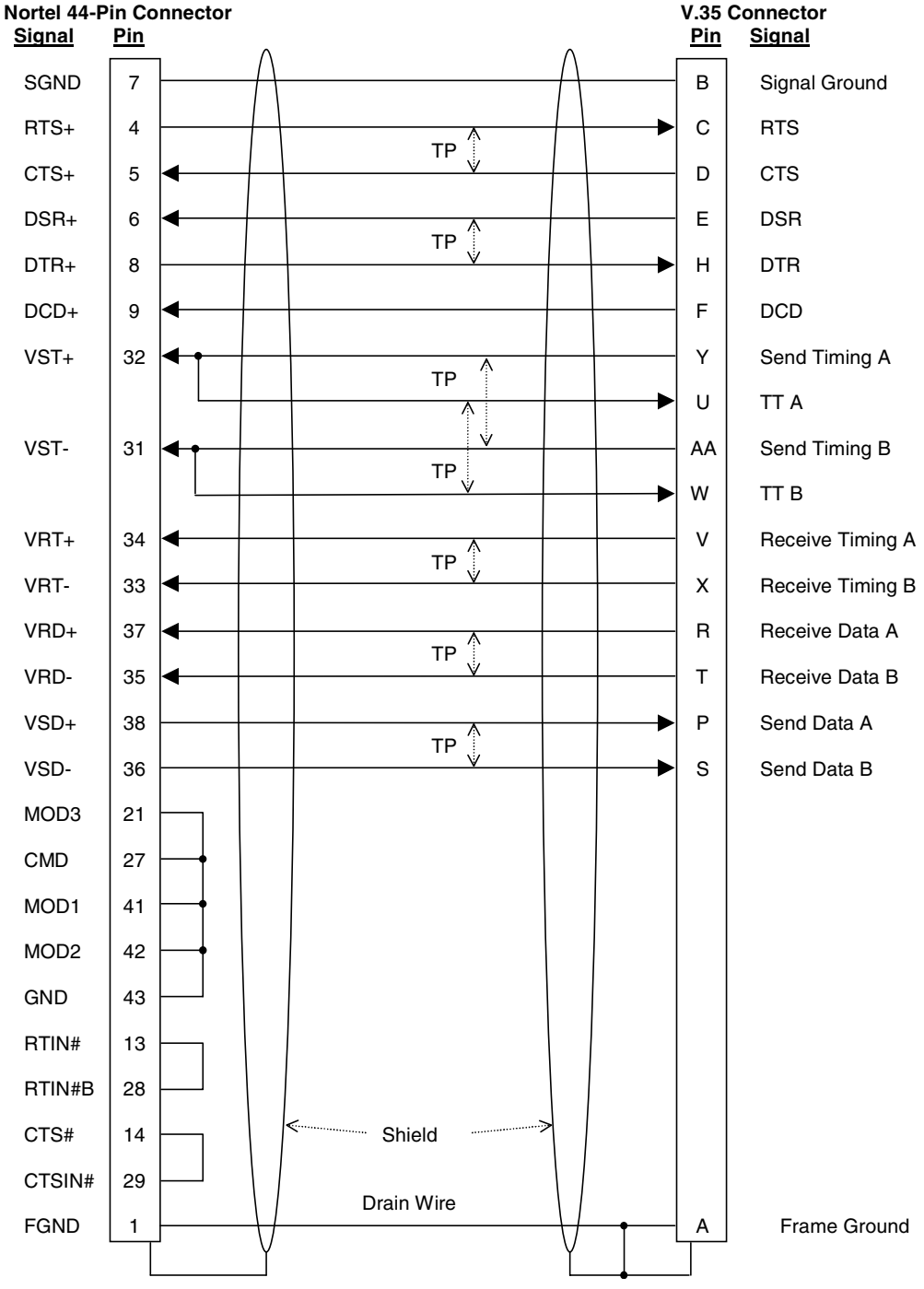
44-position D-sub plug with screw locks
(ground shield connected to backshell)

34-position V.35 plug with screw jack retainers
(ground shield connected to backshell)

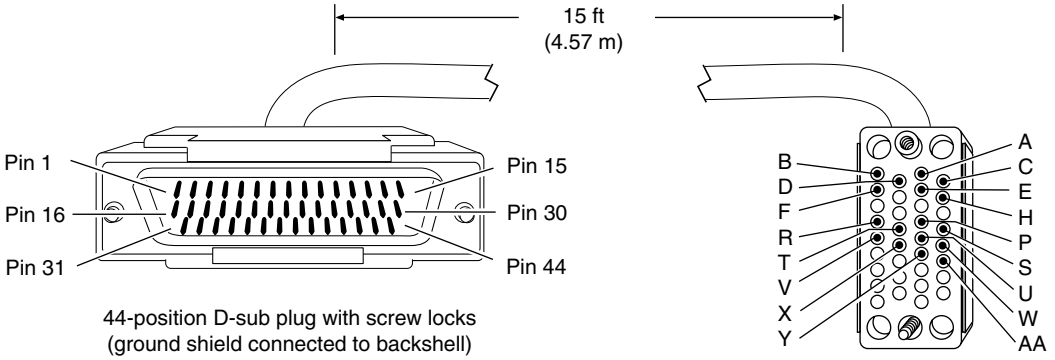
CAB0106A

Industry Interface Type: V.35

Note: Connections marked TP are twisted pair.


Nortel 44-Pin Connector
Signal
Pin
V.35 Connector
Pin
Signal
SGND 7 B Signal Ground
RTS+ 4 C RTS
CTS+ 5 D CTS
DSR+ 6 E DSR
DTR+ 8 H DTR
DCD+ 9 F DCD
VST+ 32 Y Send Timing A
U TT A
VST- 31 AA Send Timing B
W TT B
VRT+ 34 V Receive Timing A
VRT- 33 X Receive Timing B
VRD+ 37 R Receive Data A
VRD- 35 T Receive Data B
VSD+ 38 P Send Data A
VSD- 36 S Send Data B
MOD3 21
CMD 27
MOD1 41
MOD2 42
GND 43
RTIN# 13
RTIN#B 28
CTS# 14
CTSIN# 29
FGND 1 A Frame Ground
TP
Shield
Drain Wire

44-Pin to V.35 Standard (Order No. AA0018060)



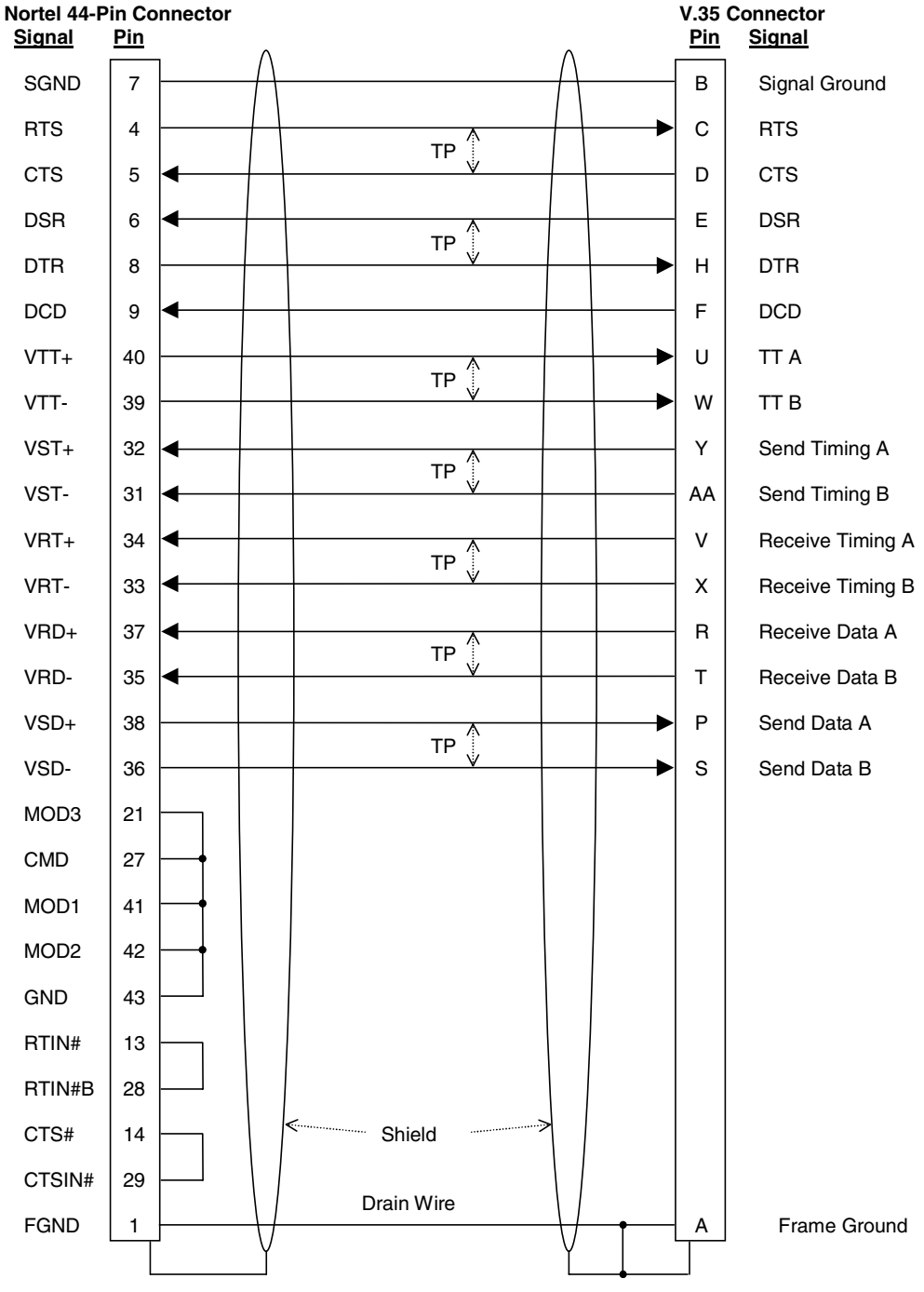
44-position D-sub plug with screw locks
(ground shield connected to backshell)

34-position V.35 plug with screw jack retainers
(ground shield connected to backshell)

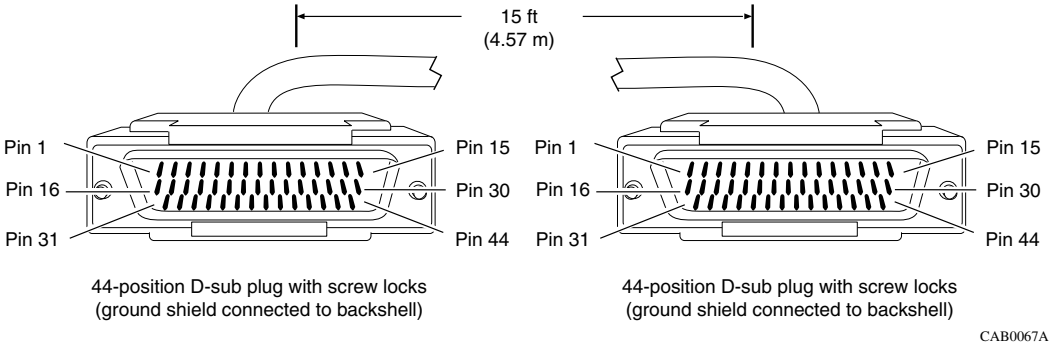
CAB0106A

Industry Interface Type: V.35

Note: Connections marked TP are twisted pair.

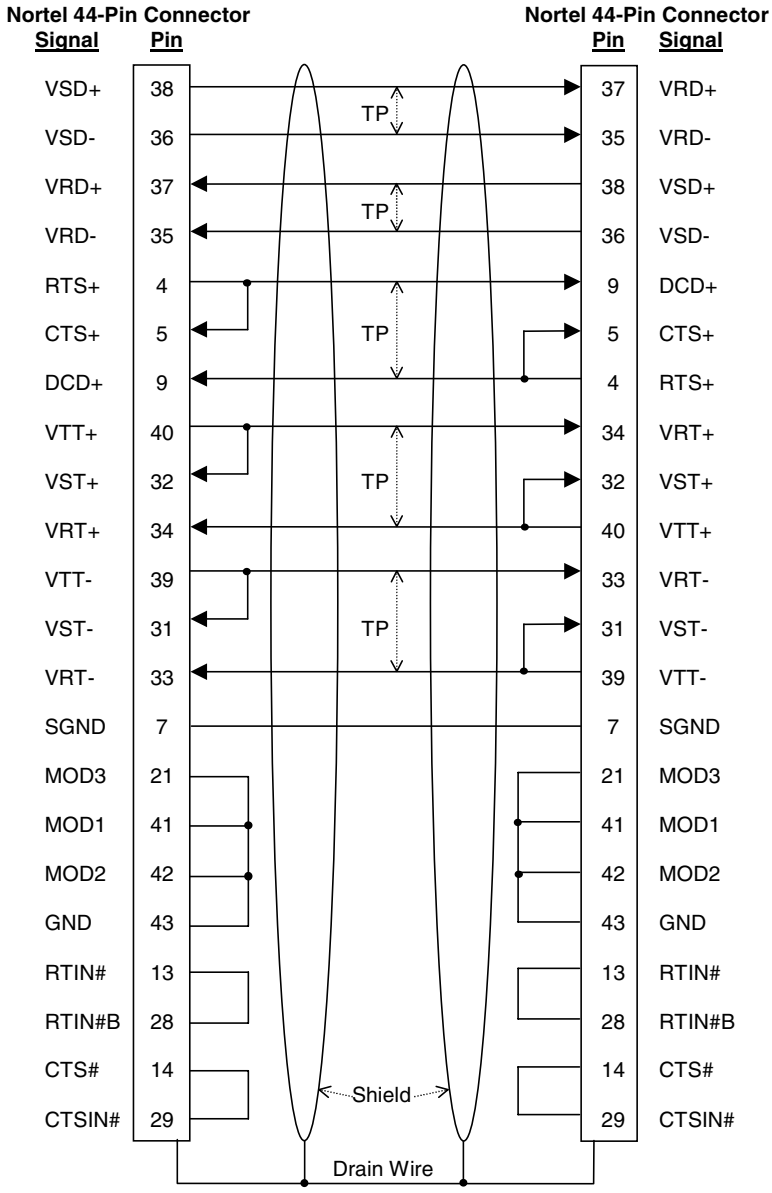

Nortel 44-Pin Connector
Signal
Pin
V.35 Connector
Pin
Signal
SGND 7 B Signal Ground
RTS 4 C RTS
CTS 5 D CTS
DSR 6 E DSR
DTR 8 H DTR
DCD 9 F DCD
VTT+ 40 U TT A
VTT- 39 W TT B
VST+ 32 Y Send Timing A
VST- 31 AA Send Timing B
VRT+ 34 V Receive Timing A
VRT- 33 X Receive Timing B
VRD+ 37 R Receive Data A
VRD- 35 T Receive Data B
VSD+ 38 P Send Data A
VSD- 36 S Send Data B
MOD3 21
CMD 27
MOD1 41
MOD2 42
GND 43
RTIN# 13
RTIN#B 28
CTS# 14
CTSIN# 29
FGND 1 A Frame Ground
TP
Shield
Drain Wire

44-Pin to 44-Pin Crossover (Order No. AA0018061)

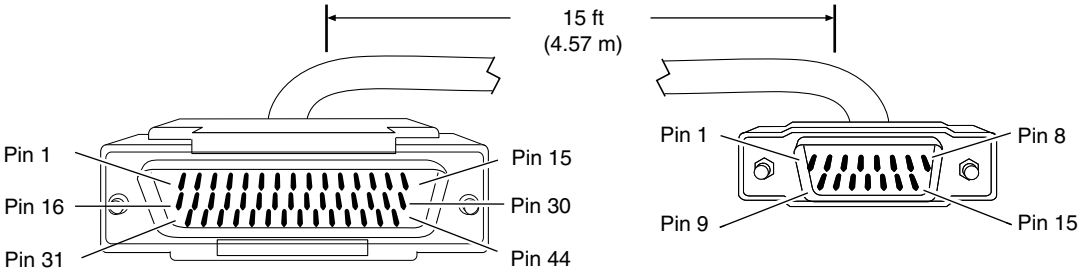


Industry Interface Type: V.35

Note: Connections marked TP are twisted pair.


Nortel 44-Pin Connector
Signal
Pin
Nortel 44-Pin Connector
Pin
Signal
VSD+ 38
VSD- 36
VRD+ 37
VRD- 35
RTS+ 4
CTS+ 5
DCD+ 9
VTT+ 40
VST+ 32
VRT+ 34
VTT- 39
VST- 31
VRT- 33
SGND 7
MOD3 21
MOD1 41
MOD2 42
GND 43
RTIN# 13
RTIN#B 28
CTS# 14
CTSIN# 29
37 VRD+
35 VRD-
38 VSD+
36 VSD-
9 DCD+
5 CTS+
4 RTS+
34 VRT+
32 VST+
40 VTT+
33 VRT-
31 VST-
39 VTT-
7 SGND
21 MOD3
41 MOD1
42 MOD2
43 GND
13 RTIN#
28 RTIN#B
14 CTS#
29 CTSIN#
TP
TP
TP
TP
TP
Shield
Drain Wire

44-Pin to X.21 Loop Timing (Order No. A0018062)

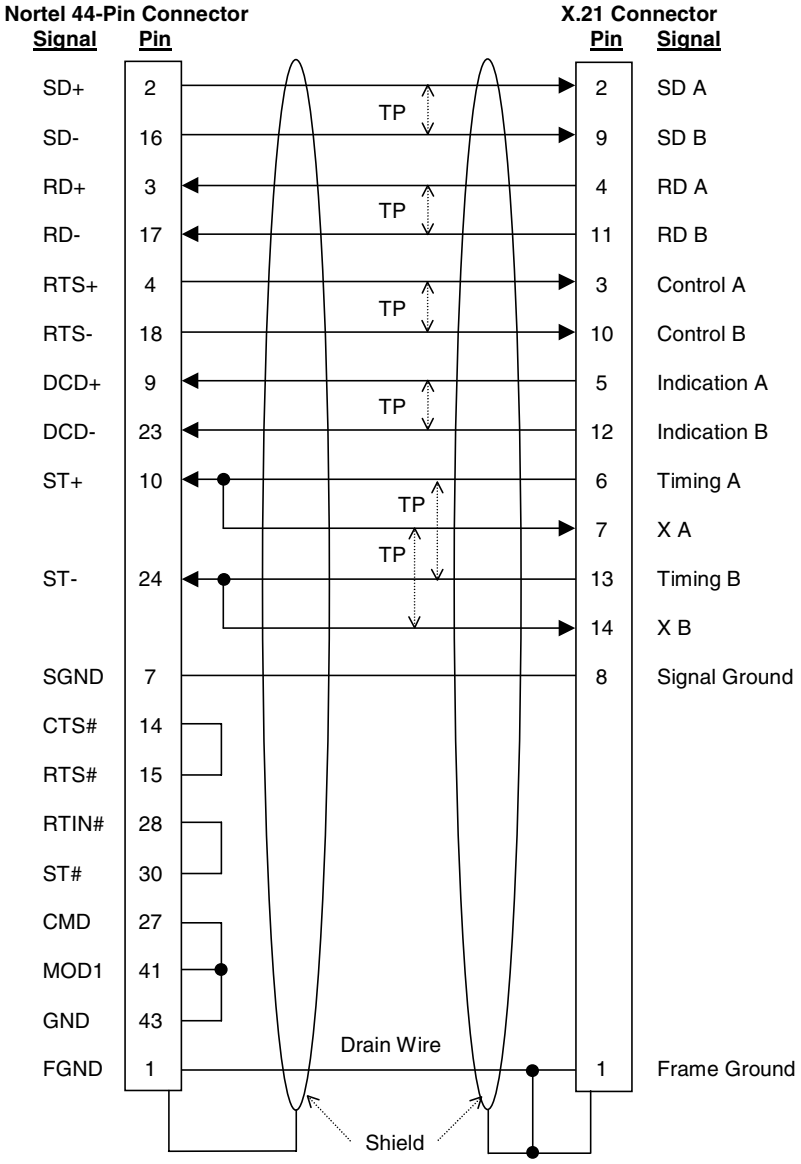


44-position D-sub plug with screw locks
(ground shield connected to backshell)

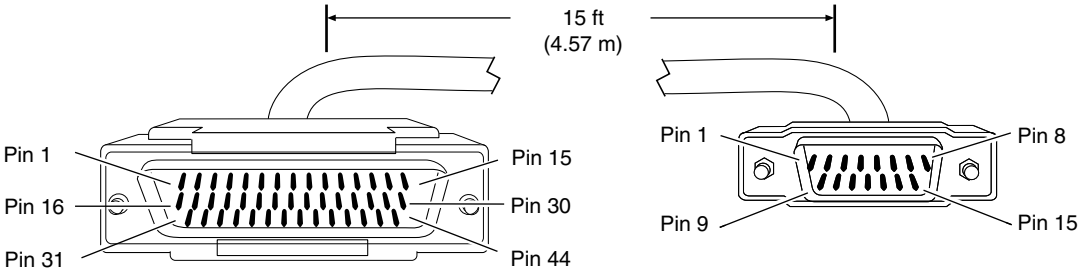
15-position D-sub plug with M-3 jack screws
(ground shield connected to backshell)

CAB0104A

Industry Interface Type: X.21


Nortel 44-Pin Connector
Signal
Pin
X.21 Connector
Pin
Signal
SD+ 2
SD- 16
RD+ 3
RD- 17
RTS+ 4
RTS- 18
DCD+ 9
DCD- 23
ST+ 10
ST- 24
SGND 7
CTS# 14
RTS# 15
RTIN# 28
ST# 30
CMD 27
MOD1 41
GND 43
FGND 1
TP
TP
TP
TP
TP
TP
2 SD A
9 SD B
4 RD A
11 RD B
3 Control A
10 Control B
5 Indication A
12 Indication B
6 Timing A
7 X A
13 Timing B
14 X B
8 Signal Ground
1 Frame Ground
Drain Wire
Shield

44-Pin to X.21 Standard (Order No. A0018063)

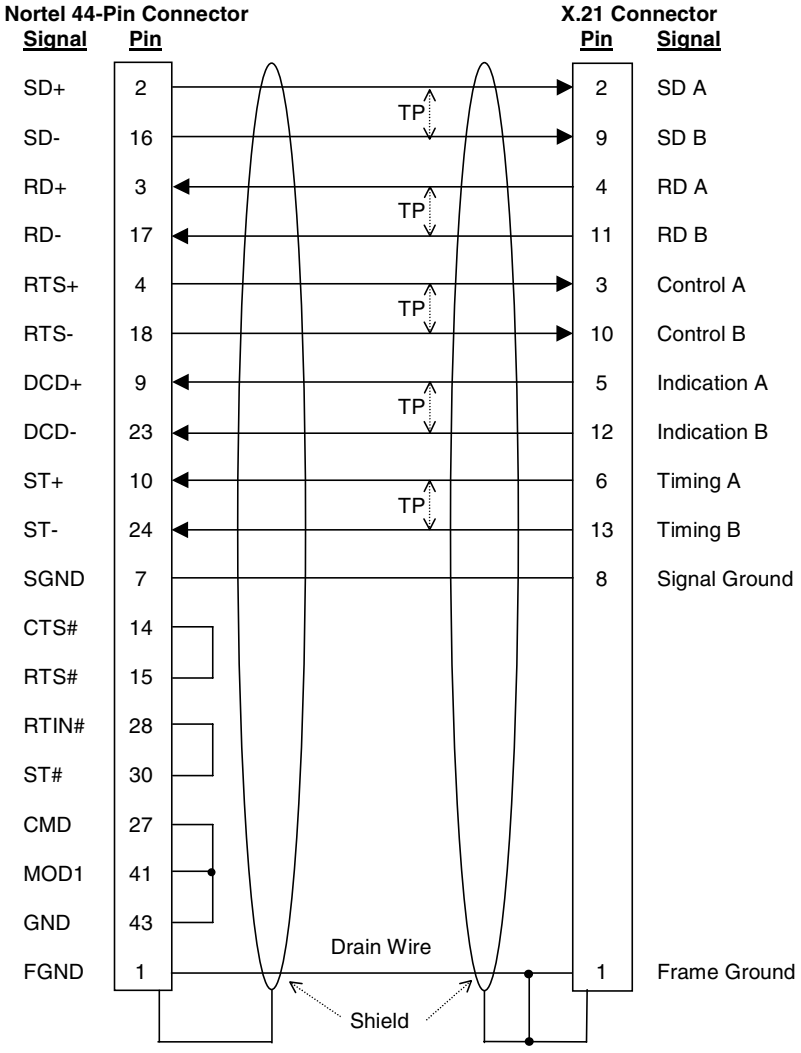


44-position D-sub plug with screw locks
(ground shield connected to backshell)

15-position D-sub plug with M-3 jack screws
(ground shield connected to backshell)

CAB0104A

Industry Interface Type: X.21


Nortel 44-Pin Connector
Signal
Pin
X.21 Connector
Pin
Signal
SD+ 2
SD- 16
RD+ 3
RD- 17
RTS+ 4
RTS- 18
DCD+ 9
DCD- 23
ST+ 10
ST- 24
SGND 7
CTS# 14
RTS# 15
RTIN# 28
ST# 30
CMD 27
MOD1 41
GND 43
FGND 1
TP
2 SD A
9 SD B
4 RD A
11 RD B
3 Control A
10 Control B
5 Indication A
12 Indication B
6 Timing A
13 Timing B
8 Signal Ground
1 Frame Ground
Drain Wire
Shield

Chapter 7
Dial-Up Services Cables

This chapter identifies dial-up services cables necessary for linking Nortel Networks router hardware platforms to WAN dial-on-demand and dial backup devices.

Note: Order Nos. 7220, 7318, 7826, 7932, 7937, 7943, AA0018049, AA0018052, AA0018054, AA0018057, and AA0018060 (which are described in Chapter 6) support V.25bis.

Table 7-1 summarizes the cables. Detailed cable illustrations and pinout specifications follow.

Table 7-1. Dial-Up Services Cables

Order No.	Length	Physical Cable Description	Raise DTR	V.25bis	Page
7116	15 ft (4.57 m)	15-pin D-sub plug to RS-422 plug		✓	7-4
7117	15 ft (4.57 m)	15-pin D-sub plug to RS-422 plug	✓		7-6
7118	15 ft (4.57 m)	15-pin D-sub plug to RS-232-C plug	✓		7-8
7119	15 ft (4.57 m)	15-pin D-sub plug to RS-232-C plug		✓	7-9
7120	15 ft (4.57 m)	15-pin D-sub plug to V.35 plug		✓	7-10
7121	15 ft (4.57 m)	15-pin D-sub plug to V.35 plug	✓		7-11
7137	15 ft (4.57 m)	44-pin D-sub plug to V.35 plug	✓		7-12
7138	15 ft (4.57 m)	44-pin D-sub plug to RS-232-C plug	✓		7-14

Table 7-1. Dial-Up Services Cables *(continued)*

Order No.	Length	Physical Cable Description	Raise DTR	V.25bis	Page
					(continued)
7139	15 ft (4.57 m)	44-pin D-sub plug to RS-422 plug	✓		7-15
7933	15 ft (4.57 m)	50-pin to V.35 with raise DTR	✓		7-17
7935	15 ft (4.57 m)	50-pin to RS-232-C with raise DTR	✓		7-19
AA0018047	15 ft (4.57 m)	44-pin to RS-232-C DTR	✓		7-20
AA0018050	15 ft (4.57 m)	44-pin to RS-422 DTR	✓		7-22
AA0018055	15 ft (4.57 m)	44-pin to V.28 DTR	✓		7-24
AA0018058	15 ft (4.57 m)	44-pin to V.35 DTR	✓		7-26

Note: Refer to “New Synchronous Cable Cross Reference” in Chapter 1 for information about how to cross reference older legacy cables to the new fully functional cables.

If you need to order additional cables, contact the Nortel Networks Technical Solutions Center in your area. (See “How to Get Help” in the Preface.)

The following sections include:

- Illustrations for each cable with the Nortel Networks connector on the left and the remote connector on the right
- Cable length information

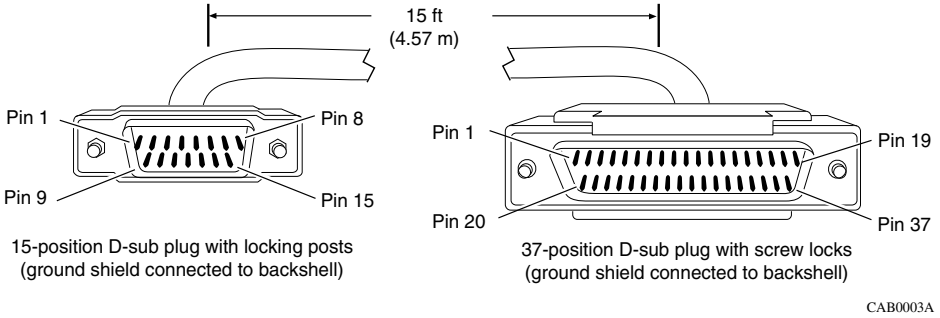
  If you want to build a cable, and you want to determine the maximum cable length appropriate for each of your interconnection requirements, you should:

  -- Identify in this chapter a cable that satisfies your wiring requirement (with the exception of total cable length).

  -- Consult the networking industry specification, standard, or recommendation designated in the “Industry Interface Type” entry for that cable (located immediately following the cable pinout diagram).
- Pinouts for each connector and all associated signals
- Wire jumper identification for either connector (when applicable)

  For example, the 15-pin D-sub to RS-422 cable (Order No. 7116) lists internal wire connections (Pin 7 > 12; Pin 25 > 30) in the Remote Termination column. This indicates that you must connect pin 7 to pin 12 and pin 25 to pin 30 inside the remote connector.
- Grounding arrangements that isolate the chassis from the DC ground within the cable

15-Pin D-Sub to RS-422: V.25bis (Order No. 7116)

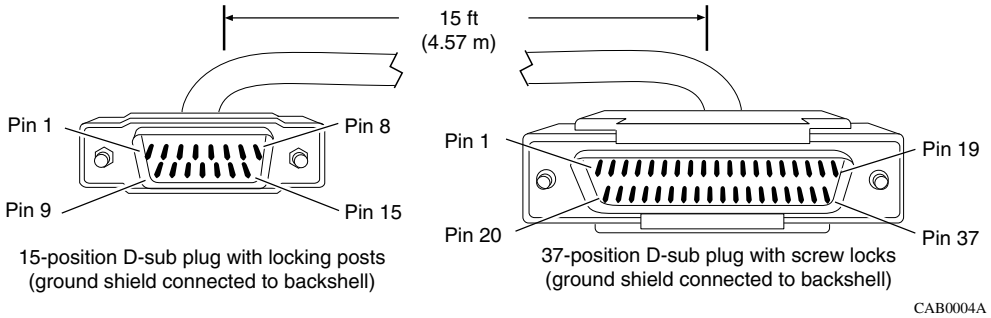


Industry Interface Type: RS-449/RS-422

Nortel Networks Termination		Remote Termination
Signal	**Pin # to Pin #**	**Signal**
Signal Ground	1	37	Send Ground
Send Data +	2	4	Send Data A
Send Data -	3	22	Send Data B
Serial Clock Transmit +	4	5	Send Timing A
Serial Clock Transmit -	5	23	Send Timing B
Request to Send +	6	7	Request to Send A
Clear to Send -	7	27	Clear to Send B
Clear to Send +	8	9	Clear to Send A
Data Carrier Detect -	9	29	Data Mode B
Data Carrier Detect +	10	11	Data Mode A
Serial Clock Receive -	11	26	Receive Timing B
Serial Clock Receive +	12	8	Receive Timing A
Receive Data -	13	24	Receive Data B
Receive Data +	14	6	Receive Data A
Request to Send -	15	25	Request to Send B
Internal Wire Connections		
		Pin 7 > 12 (Terminal Ready A)
		Pin 25 > 30 (Terminal Ready B)

Note: You must move jumpers B and C to the X.21 (2-3) position to support this interface.

15-Pin D-Sub to RS-422: Raise DTR (Order No. 7117)

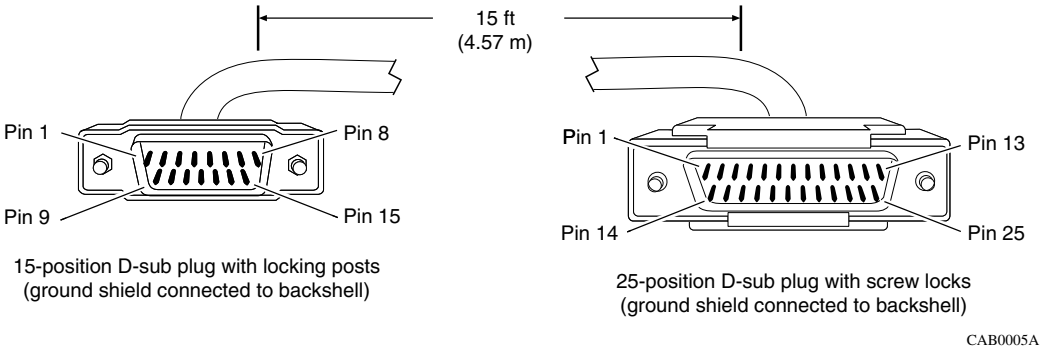


Industry Interface Type: RS-449/RS-422

Nortel Networks Termination		**Remote Termination**
Signal	**Pin # to Pin #**	**Signal**
Signal Ground	1	37	Send Ground
Send Data +	2	4	Send Data A
Send Data -	3	22	Send Data B
Serial Clock Transmit +	4	5	Send Timing A
Serial Clock Transmit -	5	23	Send Timing B
Request to Send +	6	7	Request to Send A
Clear to Send -	7	29	Data Mode B
Clear to Send +	8	11	Data Mode A
Data Carrier Detect +	10	15	Incoming Call
Serial Clock Receive -	11	26	Receive Timing B
Serial Clock Receive +	12	8	Receive Timing A
Receive Data -	13	24	Receive Data B
Receive Data +	14	6	Receive Data A
Request to Send -	15	25	Request to Send B
Internal Wire Connections		
Pin 1 > 9		Pin 7 > 12 (Terminal Ready A)
		Pin 25 > 30 > 37

Note: You must move jumpers B and C to the X.21 (2-3) position to support this interface.

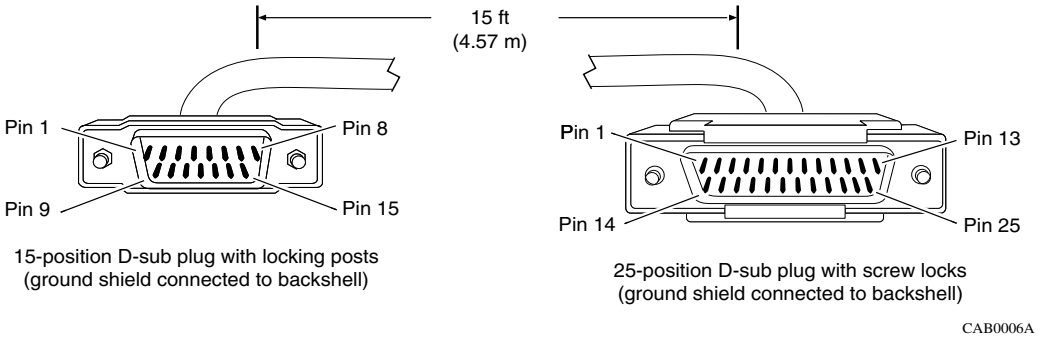
15-Pin D-Sub to RS-232-C: Raise DTR (Order No. 7118)



Industry Interface Type: RS-232-C

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Signal Ground	1	7	Signal Ground
Transmitted Data	2	2	Transmitted Data
Transmitter Signal Element Timing (DTE Source)	3	24	Transmitter Signal Element Timing (DTE Source)
Transmitter Signal Element Timing (DCE Source)	4	15	Transmitter Signal Element Timing (DCE Source)
Request to Send	6	4	Request to Send
Clear to Send	8	6	Data Set Ready
Data Carrier Detect	10	22	Ring Indicator
Receiver Signal Element Timing (DCE Source)	12	17	Receiver Signal Element Timing (DCE Source)
Received Data	14	3	Received Data
Internal Wire Connections			
Pin 1 > 7		Pin 4 > 20 (Data Terminal Ready)	

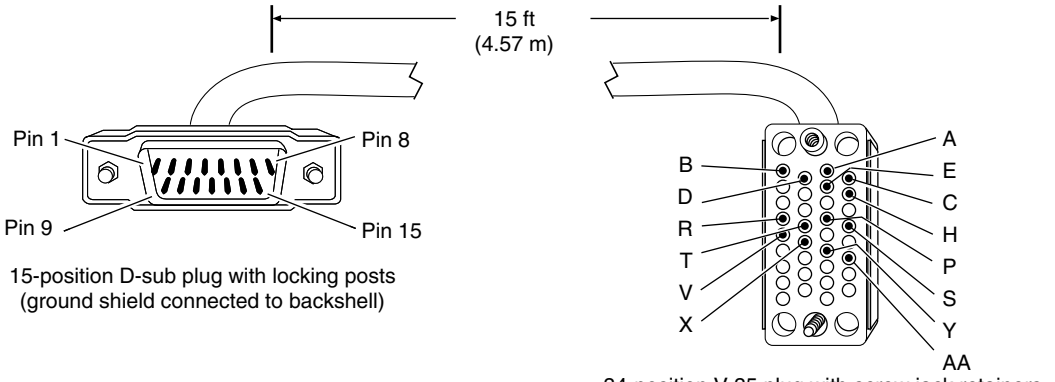
15-Pin D-Sub to RS-232-C: V.25bis (Order No. 7119)



Industry Interface Type: RS-232-C

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Signal Ground	1	7	Signal Ground
Transmitted Data	2	2	Transmitted Data
Transmitter Signal Element Timing (DTE Source)	3	24	Transmitter Signal Element Timing (DTE Source)
Transmitter Signal Element Timing (DCE Source)	4	15	Transmitter Signal Element Timing (DCE Source)
Request to Send	6	4	Request to Send
Clear to Send	8	5	Clear to Send
Data Carrier Detect	10	6	Data Set Ready
Receiver Signal Element Timing (DCE Source)	12	17	Receiver Signal Element Timing (DCE Source)
Received Data	14	3	Received Data
Internal Wire Connections			
Pin 1 > 7		Pin 4 > 20 (Data Terminal Ready)	

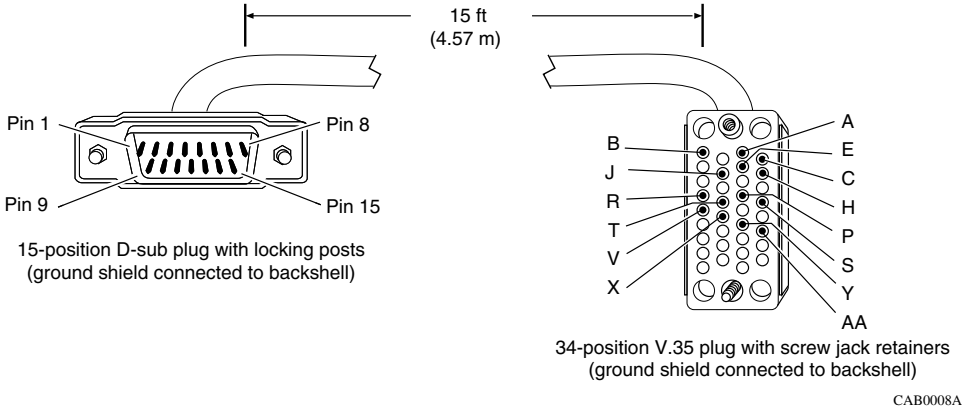
15-Pin D-Sub to V.35: V.25bis (Order No. 7120)



Industry Interface Type: V.35 (V.10 and V.11)

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Signal Ground	1	B	Signal Ground
Send Data +	2	P	Send Data A
Send Data -	3	S	Send Data B
Serial Clock Transmit +	4	Y	Send Timing A
Serial Clock Transmit -	5	AA	Send Timing B
Request to Send +	6	C	Request to Send
Clear to Send +	8	D	Clear to Send
Data Carrier Detect +	10	E	Data Set Ready
Serial Clock Receive -	11	X	Receive Timing B
Serial Clock Receive +	12	V	Receive Timing A
Receive Data -	13	T	Receive Data B
Receive Data +	14	R	Receive Data A
Internal Wire Connections			
Pin 1 > 7		Pin C > H (Data Terminal Ready)	

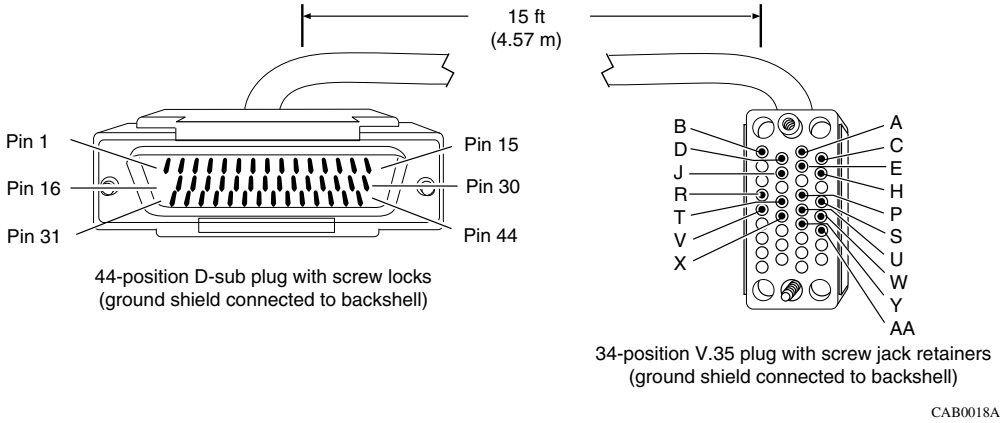
15-Pin D-Sub to V.35: Raise DTR (Order No. 7121)



Industry Interface Type: V.35 (V.10 and V.11)

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Signal Ground	1	B	Signal Ground
Send Data +	2	P	Send Data A
Send Data -	3	S	Send Data B
Serial Clock Transmit +	4	Y	Send Timing A
Serial Clock Transmit -	5	AA	Send Timing B
Request to Send +	6	C	Request to Send
Clear to Send +	8	E	Data Set Ready
Data Carrier Detect +	10	J	Ring Indicator
Serial Clock Receive -	11	X	Receive Timing B
Serial Clock Receive +	12	V	Receive Timing A
Receive Data -	13	T	Receive Data B
Receive Data +	14	R	Receive Data A
Internal Wire Connections			
Pin 1 > 7		Pin C > H (Data Terminal Ready)	

44-Pin D-Sub to V.35: Raise DTR (Order No. 7137)



44-position D-sub plug with screw locks
(ground shield connected to backshell)

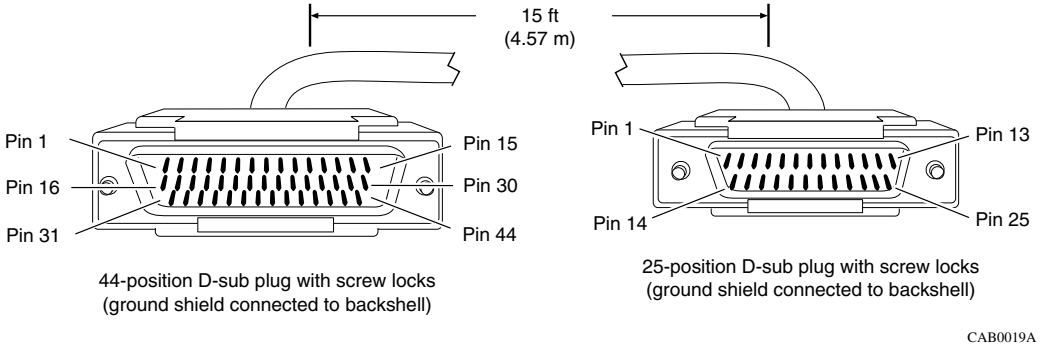
34-position V.35 plug with screw jack retainers
(ground shield connected to backshell)

CAB0018A

Industry Interface Type: V.35 (V.10 and V.11)

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Frame Ground	1	A	Frame Ground
Request to Send +	4	C	Request to Send
Clear to Send +	5	D	Clear to Send
Data Set Ready +	6	E	Data Set Ready
Data Terminal Ready +	8	H	Data Terminal Ready
Data Carrier Detect +	9	J	Ring Indicator
VTT +	40	U	Terminal Timing A
VTT -	39	W	Terminal Timing B
Signal Ground	19	B	Signal Ground
VST +	32	Y	Send Timing A
VST -	31	AA	Send Timing B
VRT +	34	V	Receive Timing A
VRT -	33	X	Receive Timing B
VRD +	37	R	Receive Data A
VRD -	35	T	Receive Data B
VSD +	38	P	Send Data A
VSD -	36	S	Send Data B
Internal Wire Connections			
Pin 7 > 19 > 20			
Pin 41 > 42 > 43			
Pin 13 > 28			
Pin 14 > 29			

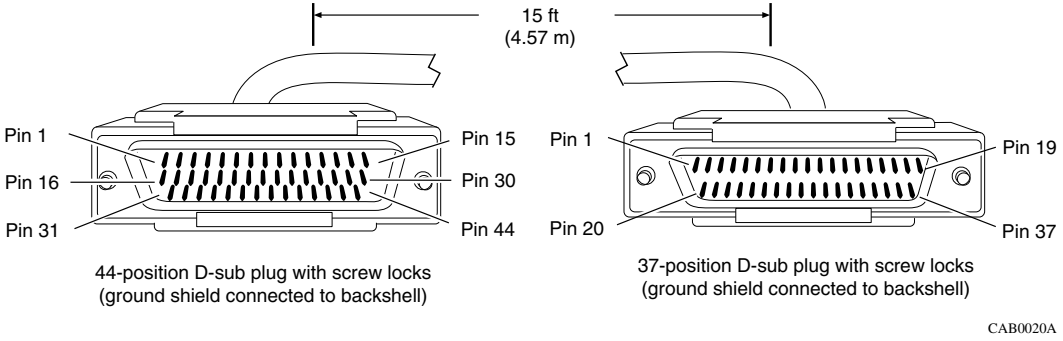
44-Pin D-Sub to RS-232-C: Raise DTR (Order No. 7138)



Industry Interface Type: RS-232-C

Nortel Networks Termination		**Remote Termination**
Signal	**Pin # to Pin #**	**Signal**
Frame Ground	1	1 Frame Ground
Send Data +	2	2 Send Data
Receive Data +	3	3 Receive Data
Request to Send +	4	4 Request to Send
Clear to Send +	5	5 Clear to Send
Data Set Ready +	6	6 Data Set Ready
Signal Ground	7	7 Signal Ground
Data Terminal Ready +	8	20 Data Terminal Ready
Data Carrier Detect +	9	22 Ring Indicator
Send Timing +	10	15 Send Timing
Receive Timing +	11	17 Receive Timing
Transmitter Signal Element Timing +	12	24 Transmitter Signal Element Timing
Internal Wire Connections		
Pin 7 > 19 > 20		
Pin 13 > 28		
Pin 14 > 29		

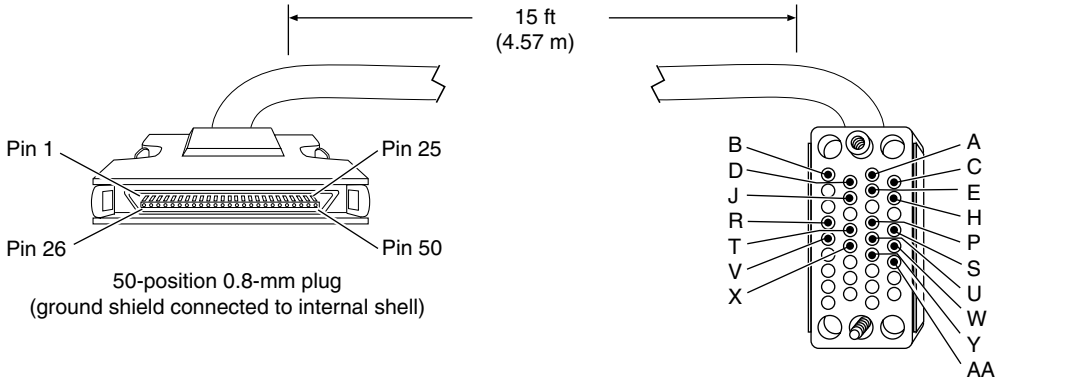
44-Pin D-Sub to RS-422: Raise DTR (Order No. 7139)



Industry Interface Type: RS-449/RS-422

Nortel Networks Termination		Remote Termination	
Signal	**Pin # to Pin #**		**Signal**
Send Data +	2	4	Send Data A
Send Data -	16	22	Send Data B
Receive Data +	3	6	Receive Data A
Receive Data -	17	24	Receive Data B
Request to Send +	4	7	Request to Send A
Request to Send -	18	25	Request to Send B
Clear to Send +	5	9	Clear to Send A
Clear to Send -	19	27	Clear to Send B
Data Set Ready +	6	11	Data Mode A
Data Set Ready -	20	29	Data Mode B
Terminal Ready +	8	12	Data Terminal Ready A
Terminal Ready -	22	30	Data Terminal Ready B
Data Carrier Detect +	9	15	Ring Indicator
Send Timing +	10	5	Send Timing A
Send Timing -	24	23	Send Timing B
Receive Timing +	11	8	Receive Timing A
Receive Timing -	25	26	Receive Timing B
Terminal Timing +	12	17	Terminal Timing A
Terminal Timing -	26	35	Terminal Timing B
Send Common	44	37	Send Common
Signal Ground	41	19	Signal Ground
Internal Wire Connections			
Pin 13 > 28			
Pin 14 > 29			
Pin 23 > 41 > 43			

50-Pin to V.35: Raise DTR (Order No. 7933)



50-position 0.8-mm plug
(ground shield connected to internal shell)

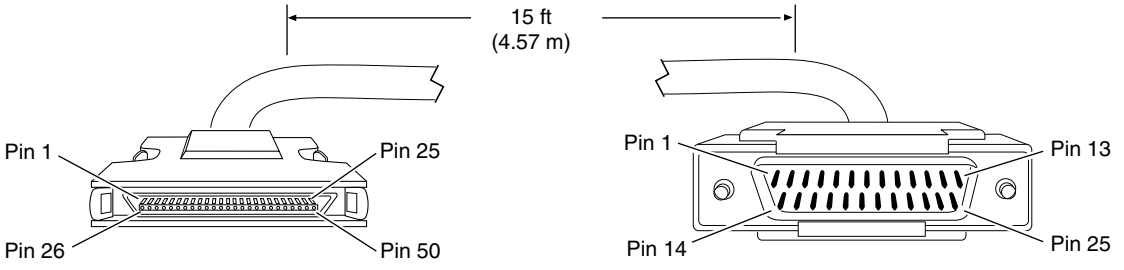
34-position V.35 plug with screw jack retainers
(ground shield connected to backshell)

CAB0071A

Industry Interface Type: V.35 (V.10 and V.11)

Nortel Networks Termination		Remote Termination	
Signal	**Pin # to Pin #**		**Signal**
VSD +	44	P	Send Data A
VSD -	19	S	Send Data B
VRT +	42	V	Receive Timing A
VRT -	17	X	Receive Timing B
VST +	41	Y	Send Timing A
VST -	16	AA	Send Timing B
VRD +	43	R	Receive Data A
VRD -	18	T	Receive Data B
Data Set Ready +	6	E	Data Set Ready
Data Terminal Ready +	8	H	Data Terminal Ready
Request to Send +	4	C	Request to Send
Clear to Send +	5	D	Clear to Send
VTT +	45	U	Terminal Timing A
VTT -	20	W	Terminal Timing B
Frame Ground	1	A	Frame Ground
Data Carrier Detect +	9	J	Ring Indicator
Signal Ground	30	B	Signal Ground
Internal Wire Connections			
Pin 7 > 30 > 31			
Pin 46 > 47 > 48			
Pin 13 > 38			
Pin 14 > 39			

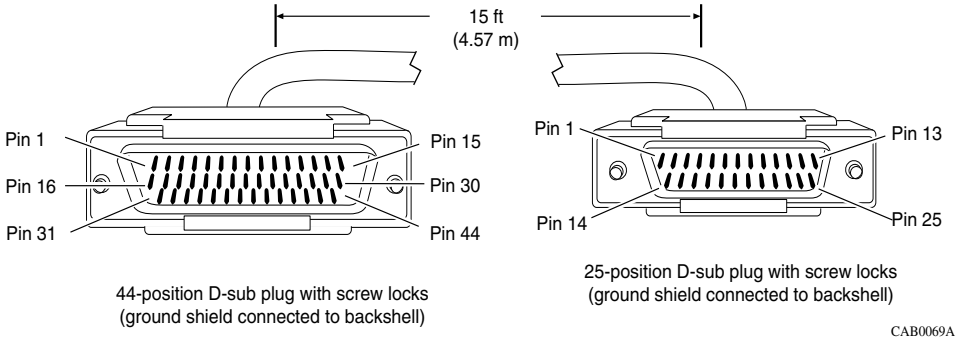
50-Pin to RS-232-C: Raise DTR (Order No. 7935)



Industry Interface Type: RS-232-C

Nortel Networks Termination		**Remote Termination**	
Signal	**Pin # to Pin #**		**Signal**
Frame Ground	1	1	Frame Ground
Send Data +	2	2	Send Data
Receive Data +	3	3	Receive Data
Request to Send +	4	4	Request to Send
Clear to Send +	5	5	Clear to Send
Data Set Ready +	6	6	Data Set Ready
Data Terminal Ready +	8	20	Data Terminal Ready
Data Carrier Detect +	9	22	Ring Indicator
Send Timing +	10	15	Send Timing
Receive Timing +	11	17	Receive Timing
Terminal Timing +	12	24	Terminal Timing
Signal Ground	7	7	Signal Ground
Internal Wire Connections			
Pin 7 > 30 > 31			
Pin 13 > 38			
Pin 14 > 39			

44-Pin to RS-232-C DTR (Order No. AA0018047)

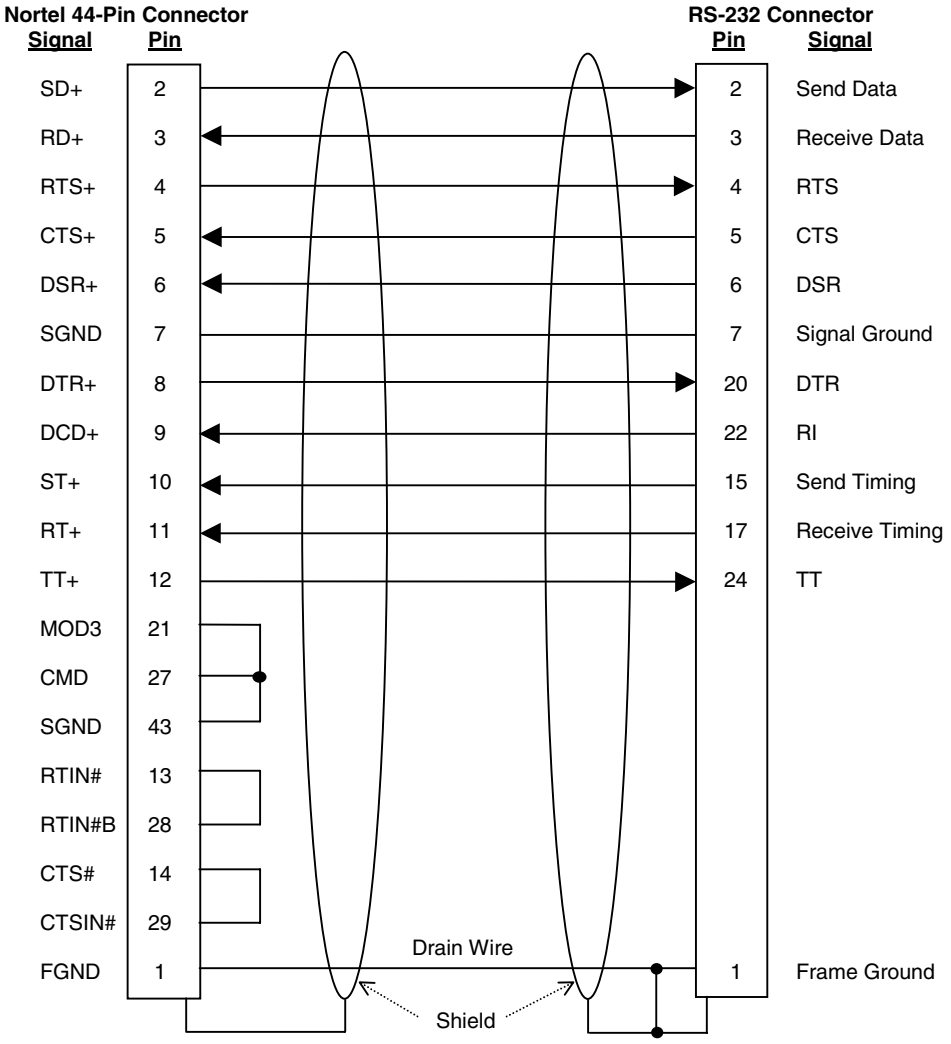


44-position D-sub plug with screw locks
(ground shield connected to backshell)

25-position D-sub plug with screw locks
(ground shield connected to backshell)

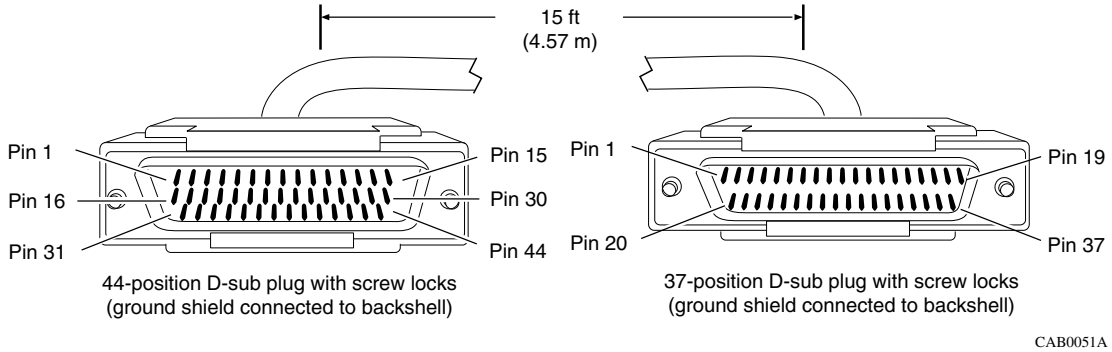
CAB0069A

Industry Interface Type: RS-232-C



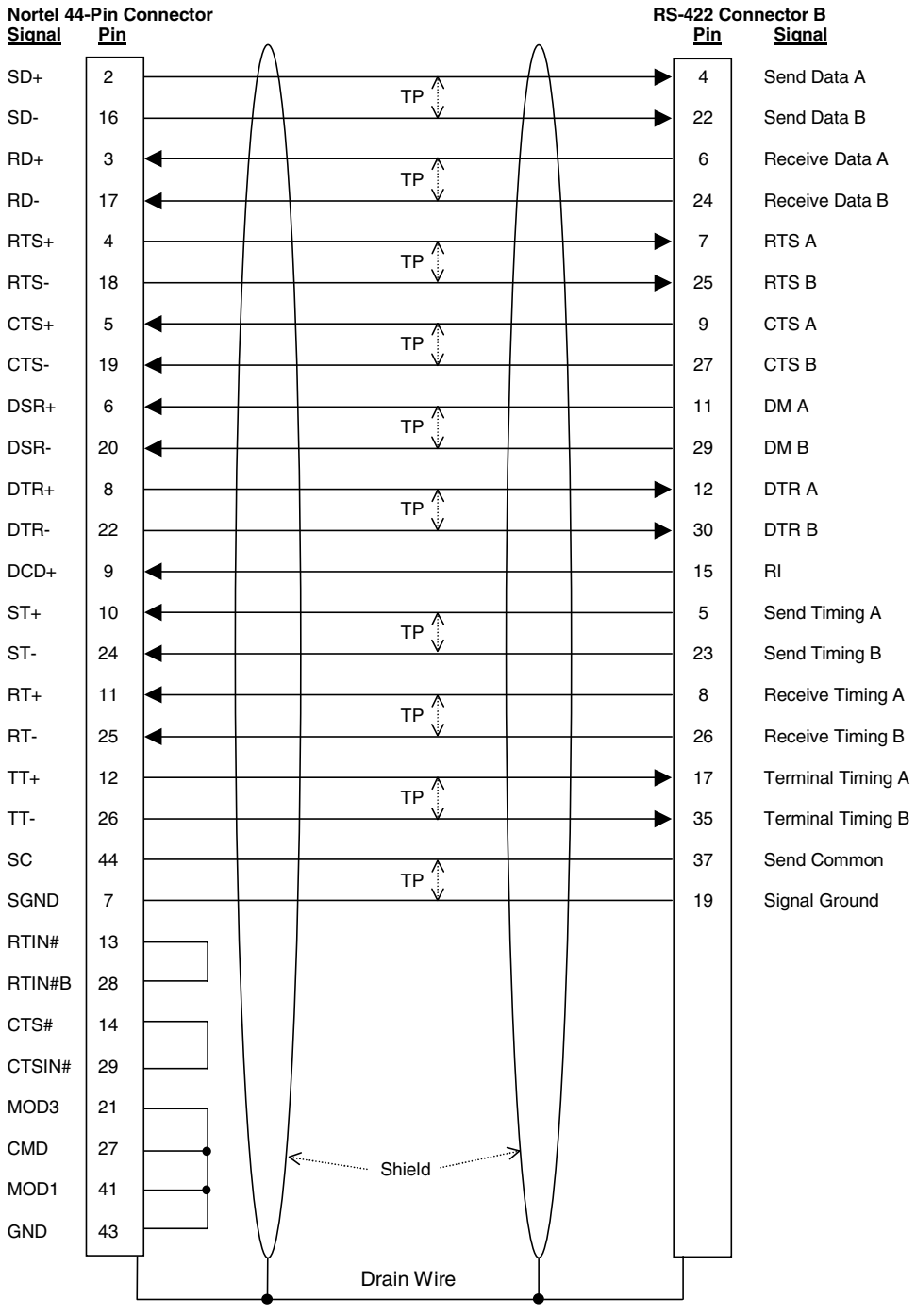
Note: Connections are individual conductors, **not twisted pair**.

44-Pin to RS-422 DTR (Order No. AA0018050)

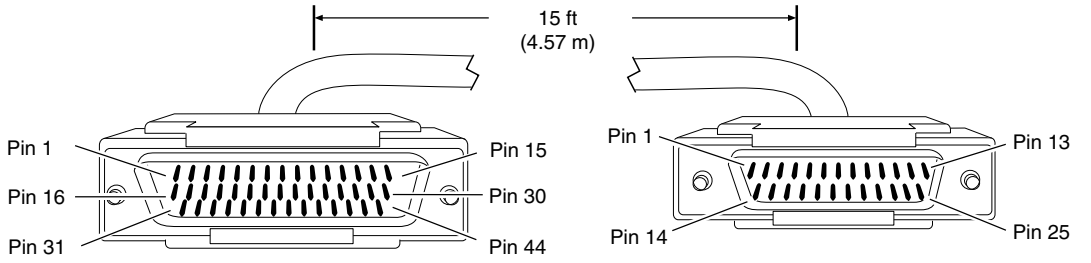


Industry Interface Type: RS-422

Note: Connections marked TP are twisted pair.


Nortel 44-Pin Connector
Signal
Pin
RS-422 Connector B
Pin
Signal
SD+ 2
SD- 16
RD+ 3
RD- 17
RTS+ 4
RTS- 18
CTS+ 5
CTS- 19
DSR+ 6
DSR- 20
DTR+ 8
DTR- 22
DCD+ 9
ST+ 10
ST- 24
RT+ 11
RT- 25
TT+ 12
TT- 26
SC 44
SGND 7
RTIN# 13
RTIN#B 28
CTS# 14
CTSIN# 29
MOD3 21
CMD 27
MOD1 41
GND 43
TP
4 Send Data A
22 Send Data B
6 Receive Data A
24 Receive Data B
7 RTS A
25 RTS B
9 CTS A
27 CTS B
11 DM A
29 DM B
12 DTR A
30 DTR B
15 RI
5 Send Timing A
23 Send Timing B
8 Receive Timing A
26 Receive Timing B
17 Terminal Timing A
35 Terminal Timing B
37 Send Common
19 Signal Ground
Shield
Drain Wire

44-Pin to V.28 DTR (Order No. AA0018055)



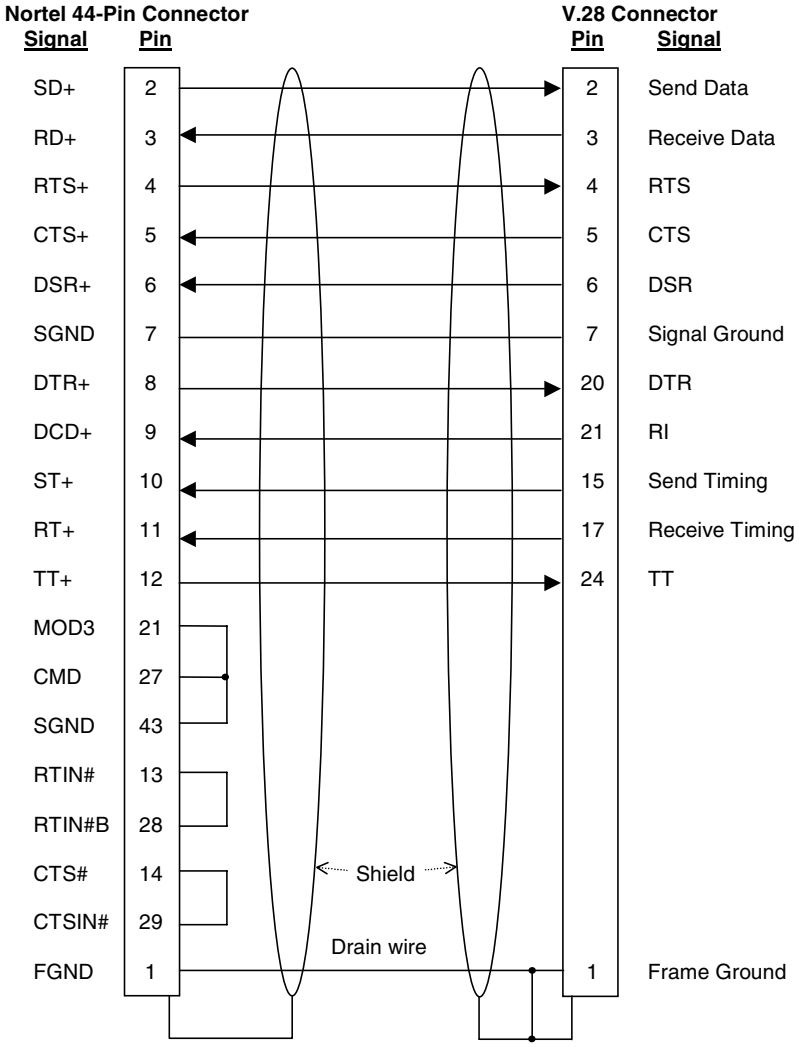
44-position D-sub plug with screw locks
(ground shield connected to backshell)

25-position D-sub plug with M-3 jack screws
(ground shield connected to backshell)

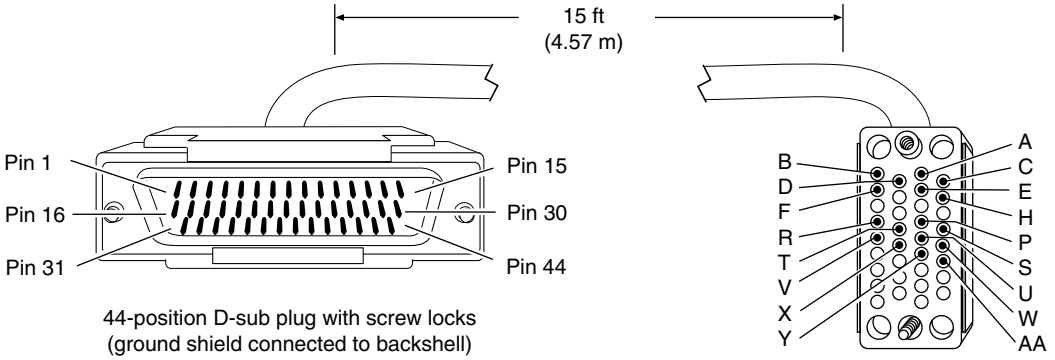
CAB0069B

Industry Interface Type: V.28

Note: Connections are individual conductors, **not twisted pair**.


Nortel 44-Pin Connector
Signal
Pin
V.28 Connector
Pin
Signal
SD+ 2 2 Send Data
RD+ 3 3 Receive Data
RTS+ 4 4 RTS
CTS+ 5 5 CTS
DSR+ 6 6 DSR
SGND 7 7 Signal Ground
DTR+ 8 20 DTR
DCD+ 9 21 RI
ST+ 10 15 Send Timing
RT+ 11 17 Receive Timing
TT+ 12 24 TT
MOD3 21
CMD 27
SGND 43
RTIN# 13
RTIN#B 28
CTS# 14
CTSIN# 29
FGND 1 1 Frame Ground
Shield
Drain wire

44-Pin to V.35 DTR (Order No. AA0018058)



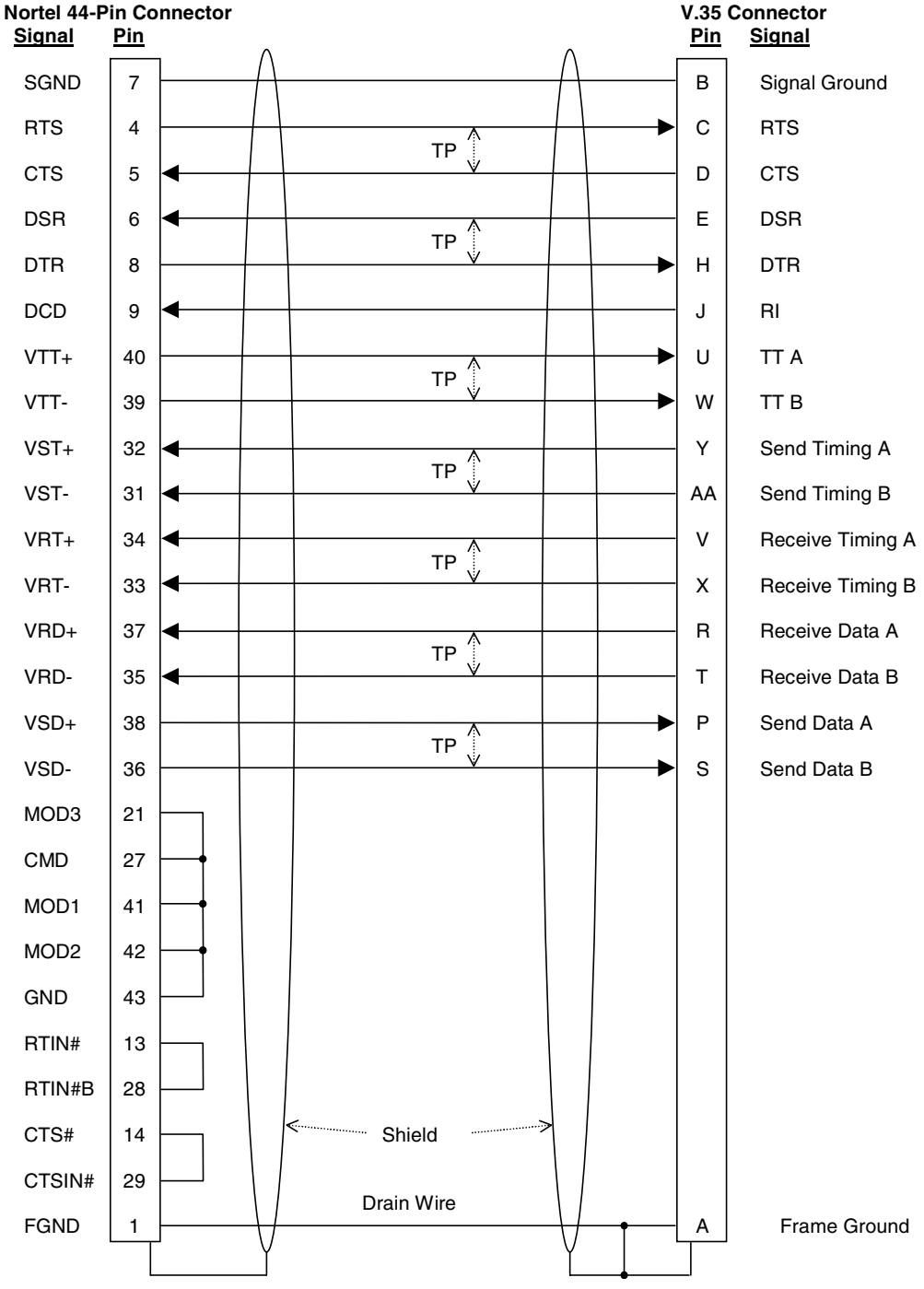
44-position D-sub plug with screw locks
(ground shield connected to backshell)

34-position V.35 plug with screw jack retainers
(ground shield connected to backshell)

CAB0106A

Industry Interface Type: V.35

Note: Connections marked TP are twisted pair.


Nortel 44-Pin Connector
Signal
Pin
V.35 Connector
Pin
Signal
SGND 7 B Signal Ground
RTS 4 C RTS
CTS 5 D CTS
DSR 6 E DSR
DTR 8 H DTR
DCD 9 J RI
VTT+ 40 U TT A
VTT- 39 W TT B
VST+ 32 Y Send Timing A
VST- 31 AA Send Timing B
VRT+ 34 V Receive Timing A
VRT- 33 X Receive Timing B
VRD+ 37 R Receive Data A
VRD- 35 T Receive Data B
VSD+ 38 P Send Data A
VSD- 36 S Send Data B
MOD3 21
CMD 27
MOD1 41
MOD2 42
GND 43
RTIN# 13
RTIN#B 28
CTS# 14
CTSIN# 29
FGND 1 A Frame Ground
TP
TP
TP
TP
TP
TP
Shield
Drain Wire

Chapter 8
Cable Adapters

This chapter identifies the cable adapters that enable existing cables to connect to different ports. These cable assemblies automatically select the appropriate interface type.

Table 8-1 summarizes the cable adapters. Detailed cable illustrations and pinouts follow.

Table 8-1. Cable Adapters

Order No.	Length	Physical Cable Description	Page
7122	12 in. (0.3 m)	44-pin to 15-pin RS-232-C cable adapter	8-3
7123	12 in. (0.3 m)	44-pin to 15-pin X.21 cable adapter	8-5
7124	12 in. (0.3 m)	44-pin to 15-pin V.35 cable adapter	8-7
7131	12 in. (0.3 m)	44-pin to 15-pin RS-422 cable adapter	8-9
7947	12 in. (0.3 m)	50-pin to 44-pin cable adapter	8-11
7948	12 in. (0.3 m)	50-pin to 15-pin V.35 cable adapter	8-14
AA0018024	12 in. (0.3 m)	50-pin to 15-pin RS-422 cable adapter	8-16
AA0018040	Not applicable	Model 460F-BN coaxial to RJ-45 adapter (Balun), for use with the AA0018040 ATM E1 RJ-45 to RJ-45 cable	8-18
309329-A	Not applicable	9-pin to 25-pin external modem adapter for Passport 5430 only	8-19
DU0011008	12 in. (0.3 m)	68-pin DSYNC connector to dual 44-pin connector adapter	8-20
DU0011009	12 in. (0.3 m)	120-pin QSYNC connector to quad 44-pin connector adaper	8-23

If you need to order additional cables, contact the Nortel Networks Technical Solutions Center in your area. (See “How to Get Help” in the Preface.)

The following sections include:

- Cable illustrations with the Nortel Networks connector on the left and the remote connector on the right
- Cable length information

  If you want to build a cable, and you want to determine the maximum cable length appropriate for that interconnection requirement, you should:

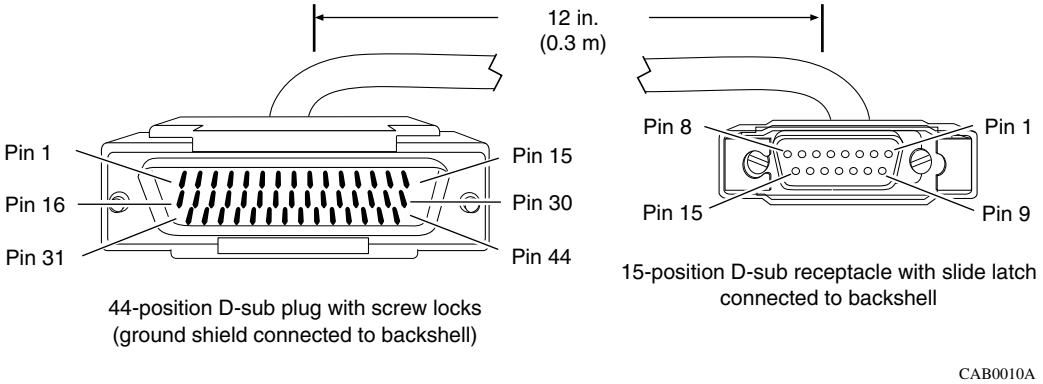
  -- Identify in this chapter a cable that satisfies your interconnection requirement (with the exception of total cable length).

  -- Consult the networking industry specification, standard, or recommendation designated in the “Industry Interface Type” entry for that cable (located immediately following the cable pinout diagram).
- Pinouts for each connector and all associated signals
- Internal wire connections for each termination (when applicable)

  For example, the 44-pin to 15-pin RS-232-C cable adapter (Order No. 7122) lists internal wire connections such as “Pin 13 > 28” in the Nortel Networks Termination column. This indicates that you must connect pin 13 to pin 28 inside the Nortel Networks termination.
- Grounding arrangements that isolate the chassis from the DC ground within the cable (when applicable)

44-Pin to 15-Pin RS-232-C Cable Adapter (Order No. 7122)

Note: This adapter enables you to connect an existing 15-pin RS-232-C cable (Order No. 7255 or 7256) to a 44-pin port. This cable assembly automatically selects the RS-232-C interface.



44-position D-sub plug with screw locks
(ground shield connected to backshell)

15-position D-sub receptacle with slide latch
connected to backshell

CAB0010A

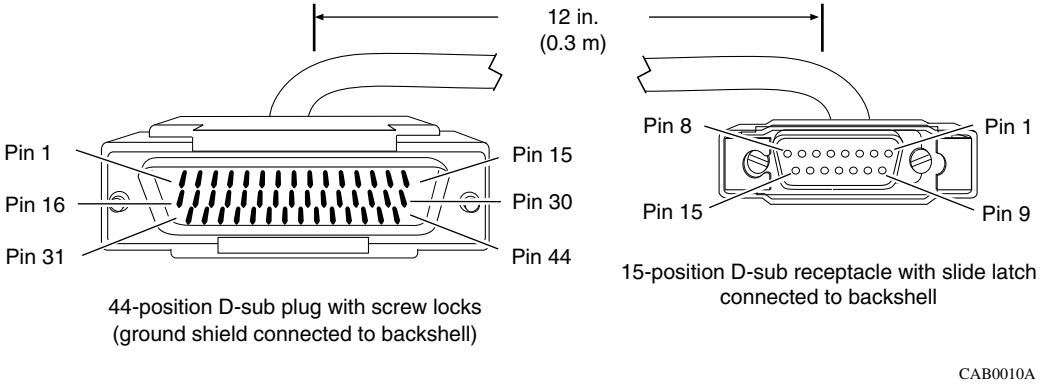
Industry Interface Type: RS-232-C

Caution: You cannot use this cable adapter to provide a clock (master) to an attached service. This is a passive straight-through cable.

Nortel Networks Termination		**Termination to Existing Cable**	
Signal	**Pin # to Pin #**		**Signal**
Send Data +	2	2	Send Data
Receive Data +	3	14	Receive Data
Request to Send +	4	6	Request to Send
Clear to Send +	5	8	Clear to Send
Data Set Ready +	6	15	Data Set Ready
Data Carrier Detect +	9	10	Data Carrier Detect
Send Timing +	10	4	Send Timing
Receive Timing +	11	12	Receive Timing
Transmitter Timing +	12	3	Transmitter Timing
Signal Ground	7	7	Signal Ground
Internal Wire Connections			
Pin 7 > 19 > 20 > 23		Pin 1 > 7 > 9	
Pin 13 > 28			
Pin 14 > 29			

44-Pin to 15-Pin X.21 Cable Adapter (Order No. 7123)

Note: This adapter enables you to connect an existing 15-pin X.21 cable (Order No. 7221) to a 44-pin port. This cable assembly automatically selects the X.21 interface.



44-position D-sub plug with screw locks
(ground shield connected to backshell)

15-position D-sub receptacle with slide latch
connected to backshell

CAB0010A

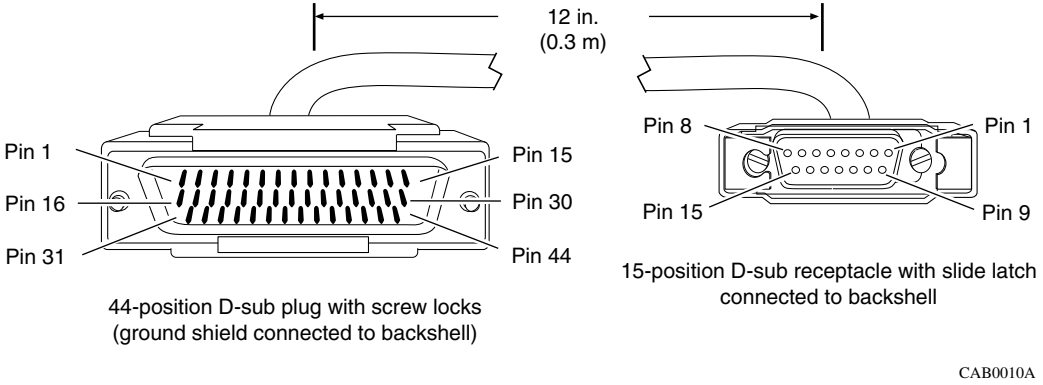
Industry Interface Type: X.21

Caution: You cannot use this cable adapter to provide a clock (master) to an attached service. This is a passive straight-through cable.

Nortel Networks Termination		**Termination to Existing Cable**	
Signal	**Pin # to Pin #**		**Signal**
Send Data +	2	2	Send Data +
Send Data -	16	3	Send Data -
Receive Data +	3	14	Receive Data +
Receive Data -	17	13	Receive Data -
Data Carrier Detect +	9	10	Data Carrier Detect +
Data Carrier Detect -	23	9	Data Carrier Detect -
Request to Send +	4	6	Request to Send +
Request to Send -	18	15	Request to Send -
Send Timing +	10	4	Timing +
Send Timing -	24	5	Timing -
Signal Ground	7	1	Signal Ground
Internal Wire Connections			
Pin 7 > 19 > 20 > 23		Pin 1 > 7 > 9	
Pin 28 > 30		Pin 4 > 12	
Pin 14 > 15		Pin 5 > 11	
Pin 41 > 43			

44-Pin to 15-Pin V.35 Cable Adapter (Order No. 7124)

Note: This adapter enables you to connect an existing 15-pin V.35 cable (Order No. 7215 or 7216) to a 44-pin port. This cable assembly automatically selects the V.35 interface.



44-position D-sub plug with screw locks
(ground shield connected to backshell)

15-position D-sub receptacle with slide latch
connected to backshell

CAB0010A

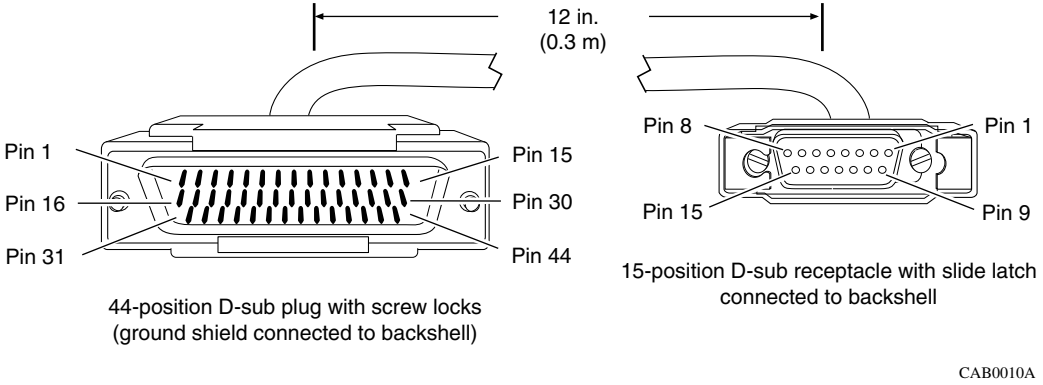
Industry Interface Type: V.35

Caution: You cannot use this cable adapter to provide a clock (master) to an attached service. This is a passive straight-through cable.

Nortel Networks Termination		**Termination to Existing Cable**	
Signal	**Pin # to Pin #**		**Signal**
VRD +	37	14	Receive Data +
VRD -	35	13	Receive Data -
VSD +	38	2	Send Data +
VSD -	36	3	Send Data -
Data Carrier Detect +	9	10	Data Carrier Detect +
Request to Send +	4	6	Request to Send +
Clear to Send +	5	8	Clear to Send +
Data Set Ready +	6	15	Data Set Ready +
VRT +	34	12	Receive Timing +
VRT -	33	11	Receive Timing -
VST +	32	4	Send Timing +
VST -	31	5	Send Timing -
Signal Ground	19	1	Signal Ground
Internal Wire Connections			
Pin 7 > 19 > 20 > 23		Pin 1 > 7 > 9	
Pin 13 > 28			
Pin 14 > 29			
Pin 41 > 42 > 43			

44-Pin to 15-Pin RS-422 Cable Adapter (Order No. 7131)

Note: This adapter enables you to connect an existing 15-pin RS-422 cable (Order No. 7315 or AA0018011) to a 44-pin port. This cable assembly automatically selects the RS-422 interface.



44-position D-sub plug with screw locks
(ground shield connected to backshell)

15-position D-sub receptacle with slide latch
connected to backshell

CAB0010A

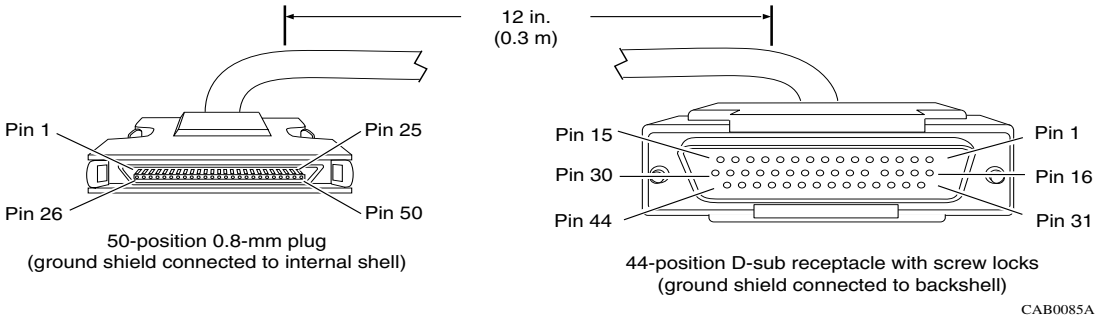
Industry Interface Type: RS-422

Caution: You cannot use this cable adapter to provide a clock (master) to an attached service. This is a passive straight-through cable.

Nortel Networks Termination		**Termination to Existing Cable**	
Signal	**Pin # to Pin #**		**Signal**
Send Data +	2	2	Send Data +
Send Data -	16	3	Send Data -
Receive Data +	3	14	Receive Data +
Receive Data -	17	13	Receive Data -
Data Carrier Detect +	9	10	Data Carrier Detect +
Data Carrier Detect -	23	9	Data Carrier Detect -
Request to Send +	4	6	Request to Send +
Request to Send -	18	15	Request to Send -
Clear to Send +	5	8	Clear to Send +
Clear to Send -	19	7	Clear to Send -
Send Timing +	10	4	Serial Clock Transmit +
Send Timing -	24	5	Serial Clock Transmit -
Receive Timing +	11	12	Serial Clock Receive +
Receive TIming -	25	11	Serial Clock Receive -
Signal Ground	7	1	Signal Ground
Internal Wire Connections			
Pin 13 > 28			
Pin 14 > 29			
Pin 41 > 43			

50-Pin to 44-Pin Cable Adapter (Order No. 7947)

Note: This adapter allows you to connect an existing 44-pin cable to a 50-pin port. The interface is automatically selected.



Industry Interface Type: Cable-dependent

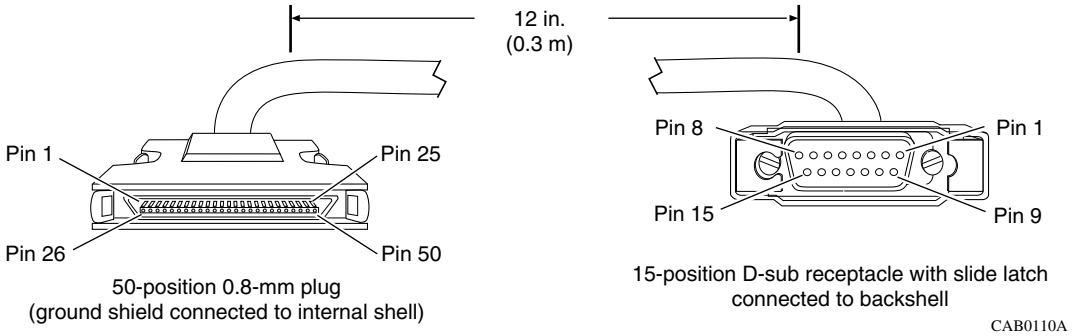
Nortel Networks 50-Pin Termination		Nortel Networks 44-Pin Termination	
Signal	**Pin # to Pin #**		**Signal**
Frame Ground	1	1	Frame Ground
Send Data +	2	2	Send Data +
Send Data -	27	16	Send Data -
Receive Data +	3	3	Receive Data +
Receive Data -	28	17	Receive Data -
Request to Send +	4	4	Request to Send +
Request to Send -	29	18	Request to Send -
Clear to Send +	5	5	Clear to Send +
Clear to Send -	30	19	Clear to Send -
Data Set Ready +	6	6	Data Set Ready +
Data Set Ready -	31	20	Data Set Ready -
Signal Ground	7	7	Signal Ground
Data Terminal Ready +	8	8	Data Terminal Ready +
Data Terminal Ready -	33	22	Data Terminal Ready -
Data Carrier Detect +	9	9	Data Carrier Detect +
Data Carrier Detect -	34	23	Data Carrier Detect -
Send Timing +	10	10	Send Timing +
Send Timing -	35	24	Send Timing -
Receive Timing+	11	11	Receive Timing +
Receive Timing-	36	25	Receive Timing -
Transmitter Timing+	12	12	Transmitter Timing +
Transmitter Timing-	37	26	Transmitter Timing -
RTIN#	13	13	RTIN#
RTINB#	38	28	RTINB#
Clear to Send#	14	14	Clear to Send#
CTSIN#	39	29	CTSIN#
RTS#	15	15	RTS#
ST#	40	30	ST#

(continued)

Nortel Networks 50-Pin Termination		Nortel Networks 44-Pin Termination	
Signal	**Pin # to Pin #**		**Signal**
V.35 Send Timing-	16	31	V.35 Send Timing-
V.35 Send Timing +	41	32	V.35 Send Timing +
V.35 Receive Timing -	17	33	V.35 Receive Timing -
V.35 Receive Timing +	42	34	V.35 Receive Timing +
V.35 Receive Data -	18	35	V.35 Receive Data -
V.35 Receive Data +	43	37	V.35 Receive Data +
V.35 Send Data -	19	36	V.35 Send Data -
V.35 Send Data +	44	38	V.35 Send Data +
V.35 Transmitter Timing -	20	39	V.35 Transmitter Timing -
V.35 Transmitter Timing +	45	40	V.35 Transmitter Timing +
UNBE	46	41	UNBE
V35D	47	42	V35D
Ground	48	43	Ground
Send Common	49	44	Send Common

50-Pin to 15-Pin V.35 Cable Adapter (Order No. 7948)

Note: This adapter allows you to connect an existing 15-pin V.35 cable (Order No. 7215 or 7216) to a 50-pin port. The V.35 interface is automatically selected.



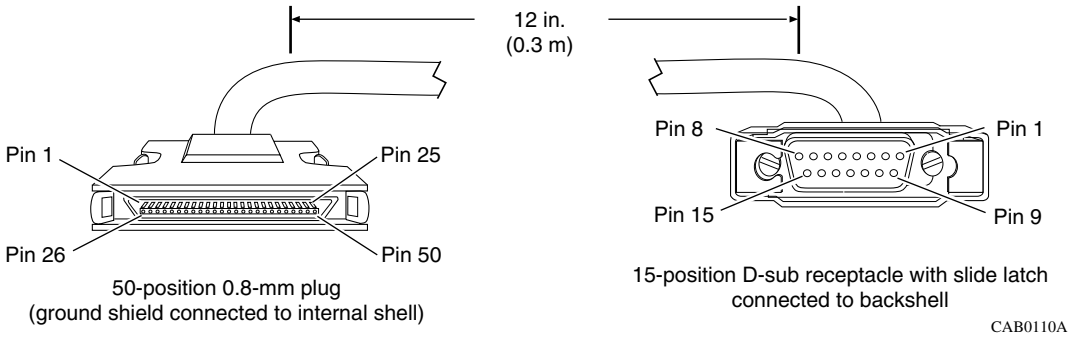
Industry Interface Type: V.35

Caution: You cannot use this cable adapter to provide a clock (master) to an attached service. This is a passive straight-through cable.

Nortel Networks Termination		**Termination to Existing Cable**	
Signal	**Pin # to Pin #**		**Signal**
V.35 Receive Data +	43	14	Receive Data +
V.35 Receive Data -	18	13	Receive Data -
V.35 Send Data +	44	2	Send Data +
V.35 Send Data -	19	3	Send Data -
Data Carrier Detect +	9	10	Data Carrier Detect +
Request to Send +	4	6	Request to Send +
Clear to Send +	5	8	Clear to Send +
Data Set Ready +	6	15	Data Set Ready +
V.RT +	42	12	Receive Timing +
VRT -	17	11	Receive Timing -
VRT +	14	4	Send Timing +
VRT -	16	5	Send Timing -
Signal Ground	7	1	Signal Ground
Internal Wire Connections			
Pin 7 > 30 > 31 > 34		Pin 1 > 7 > 9	
Pin 13 > 38			
Pin 14 > 39			
Pin 46 > 47 > 48			

50-Pin to 15-Pin RS-422 Cable Adapter (Order No. AA0018024)

Note: This adapter allows you to connect an existing 15-pin RS-422 cable (Order No. 7315 or AA0018011) to a 50-pin port. The RS-422 interface is automatically selected.



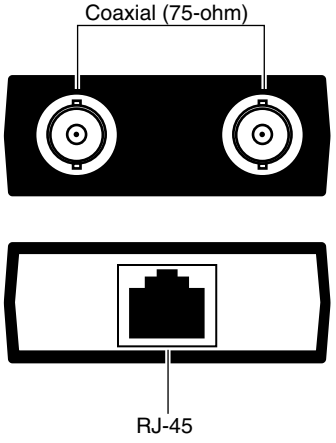
Industry Interface Type: RS-422

Caution: You cannot use this cable adapter to provide a clock (master) to an attached service. This is a passive straight-through cable.

Nortel Networks Termination		**Termination to Existing Cable**	
Signal	**Pin # to Pin #**		**Signal**
Send Data +	2	2	Send Data +
Send Data -	27	3	Send Data -
Receive Data +	3	14	Receive Data +
Receive Data -	28	13	Receive Data -
Request to Send +	4	6	Request to Send +
Request to Send -	29	15	Request to Send -
Clear to Send +	5	8	Clear to Send +
Clear to Send -	30	7	Clear to Send -
Data Carrier Detect +	9	10	Data Carrier Detect +
Data Carrier Detect -	34	9	Data Carrier Detect -
Send Timing +	10	4	Serial Clock Transmit +
Send Timing -	35	5	Serial Clock Transmit -
Receive Timing +	11	12	Serial Clock Receive +
Receive Timing -	36	11	Serial Clock Receive -
Signal Ground	7	1	Signal Ground
Internal Wire Connections			
Pin 13 > 38			
Pin 14 > 39			
Pin 46 > 48			

Model 460F-BN G.703 Coaxial to RJ-45 Adapter (Balun) (Order No. AA0018040)

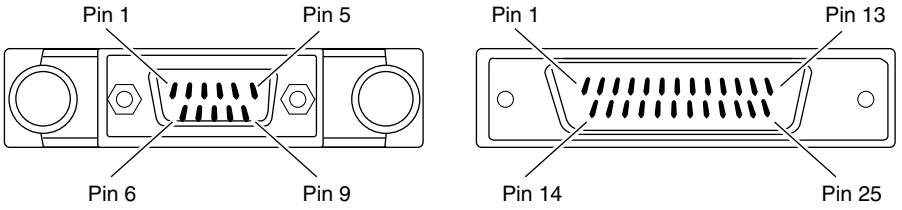
Note: This adapter allows you to connect an ATM E1 interface on a Passport 5430 (a 120-ohm, RJ-45 interface) to E1 service (dual 75-ohm, coaxial cable). Use this adapter with the AA0018040 RJ-45 to RJ-45 cable described in Chapter 5.



Industry Interface Type: E1

Passport 5430 External Modem Adapter (Order No. 309329-A)

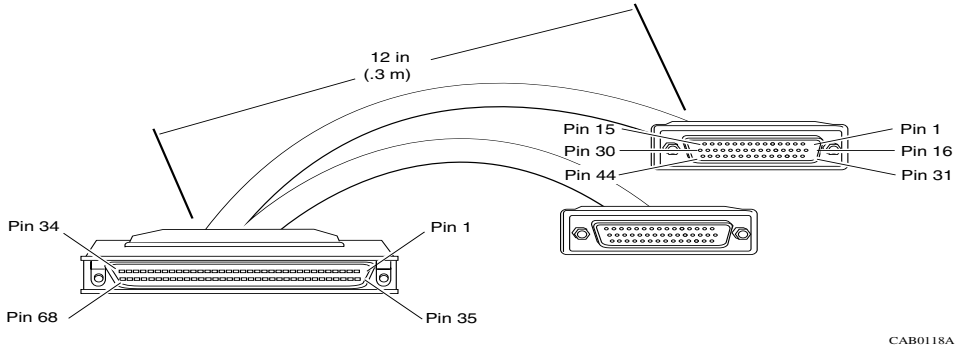
Note: This adapter allows you to connect an existing AA0018029 PC console cable to an RS-232-C modem port.

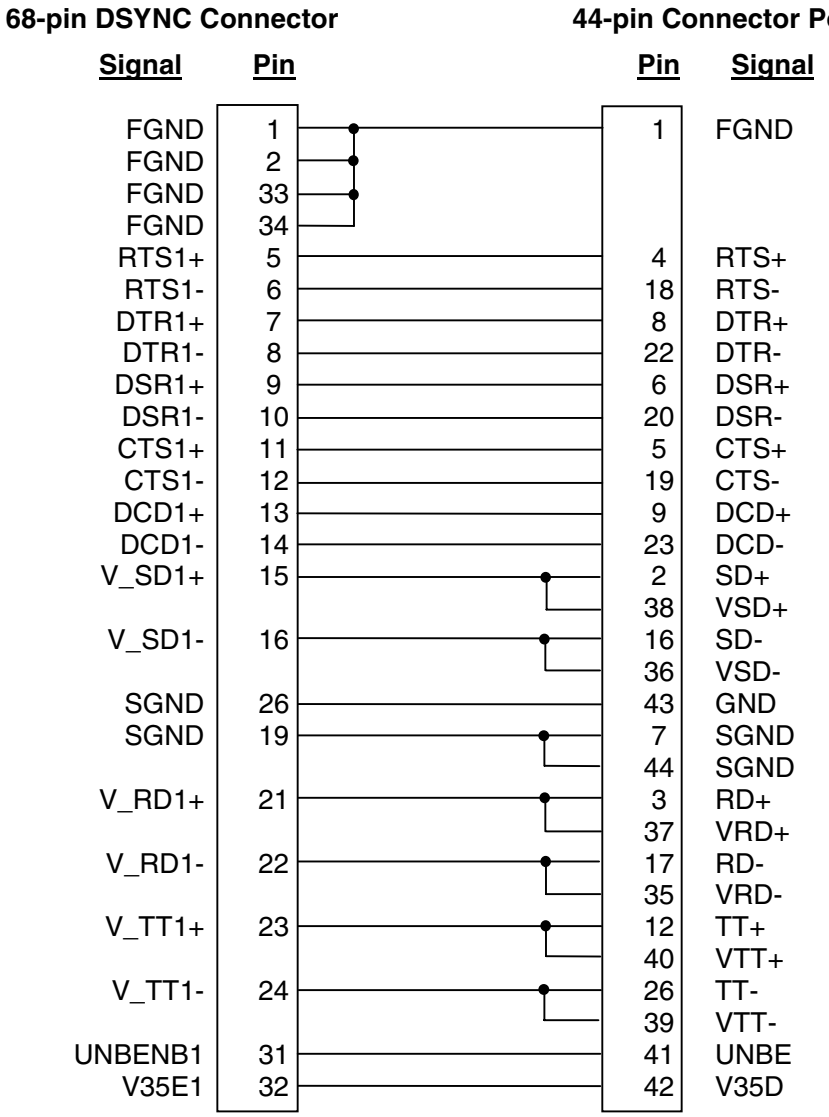


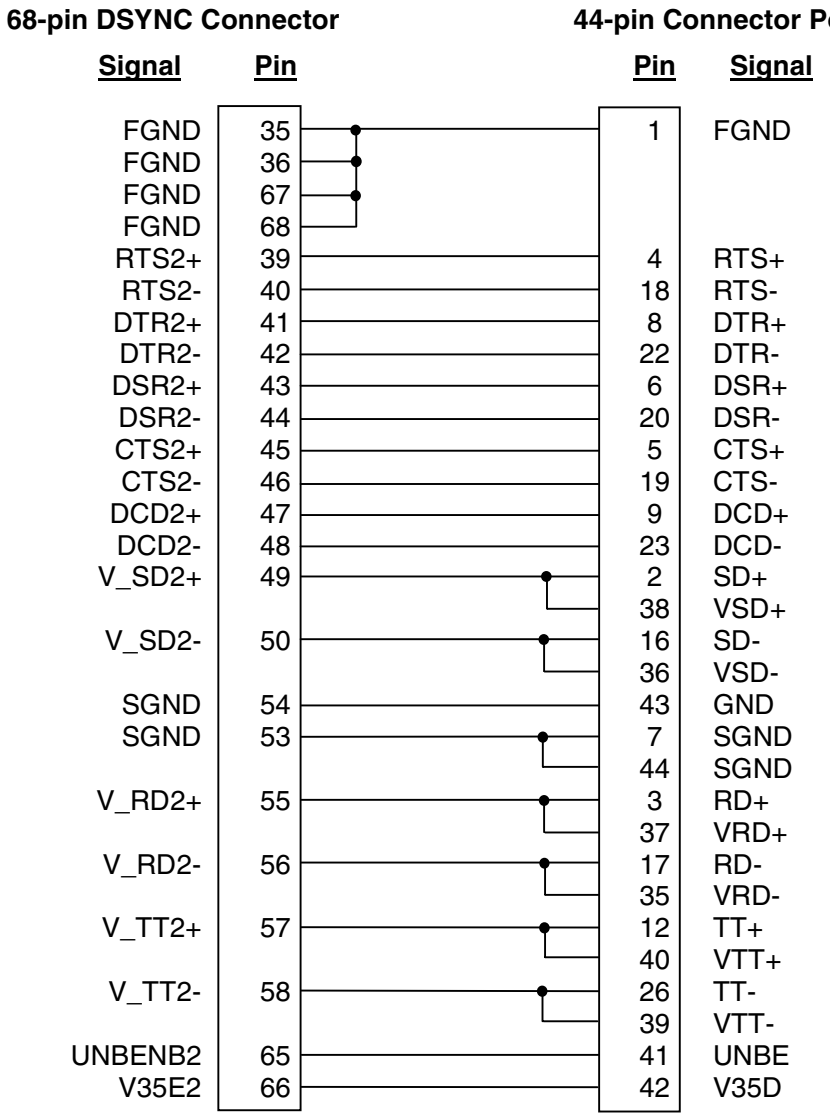
Nortel Networks Termination		Termination to Existing Cable	
Signal	**Pin # to Pin #**		**Signal**
Data Carrier Detect	1	8	Data Carrier Detect
Receive Data	2	2	Send Data
Send Data	3	3	Receive Data
Data Terminal Ready	4	20	Data Terminal Ready
Signal Ground	5	7	Signal Ground
Data Set Ready	6	6	Data Set Ready
Request to Send	7	4	Request to Send
Clear to Send	8	5	Clear to Send
Ring Indication	9	22	Ring Indication

Dual Synchronous PMC Module Adapter (Order No. DU0011008)

Note: The following data is intended for informational use only. Due to the complexity of this assembly, Nortel Networks does not recommend construction of this adapter assembly by the end user. Incorrect wiring may cause damage to one or both ports of the dual sync PMC modules. Use only Nortel Networks approved cables.

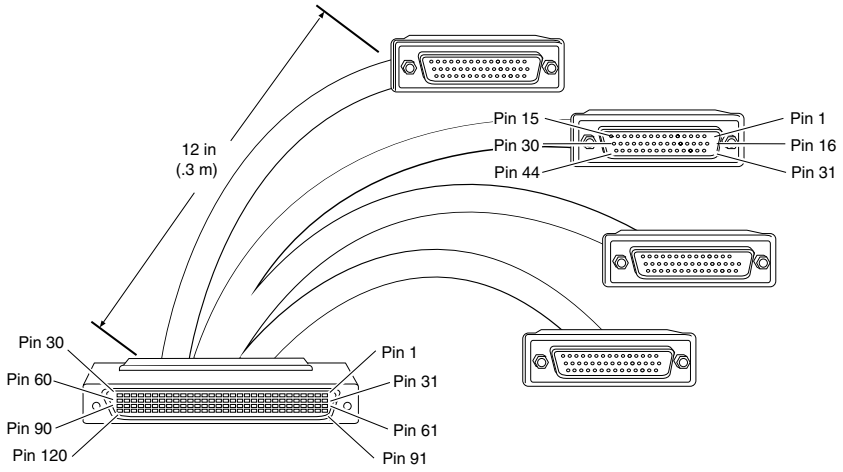


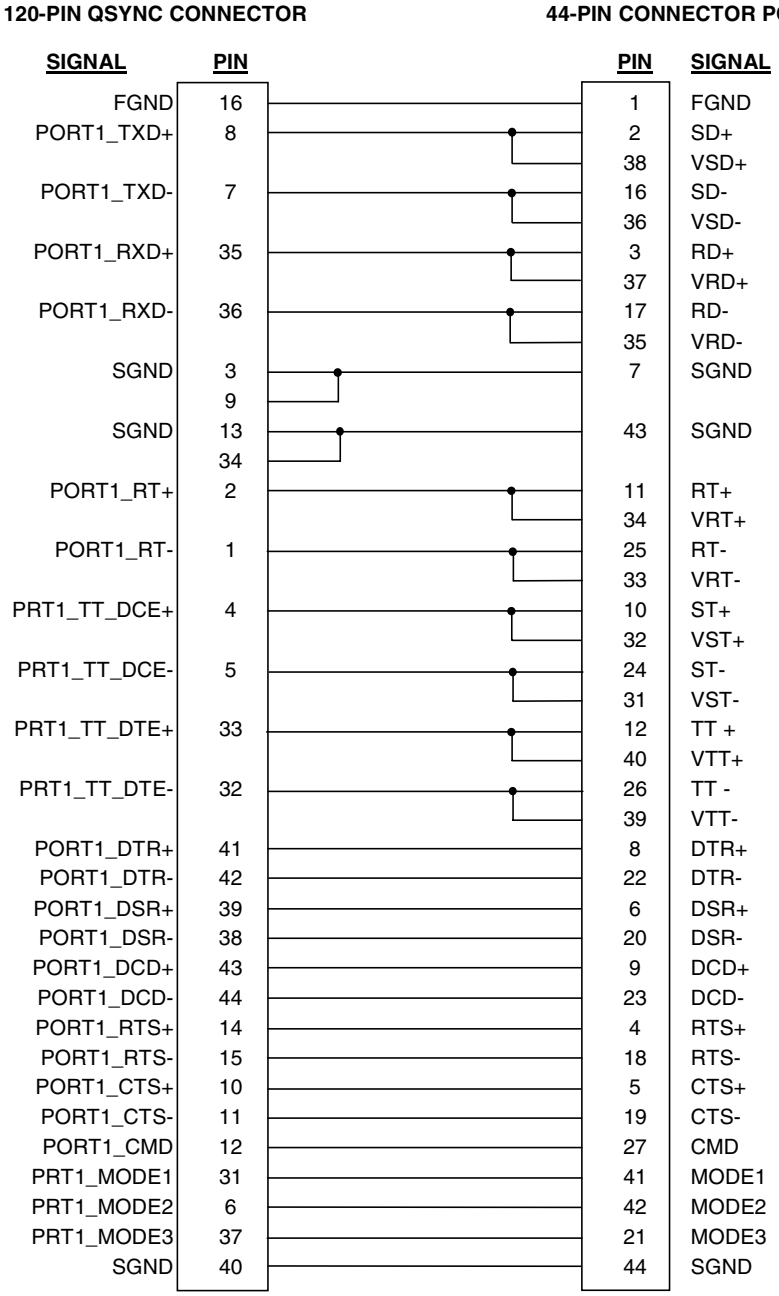

68-pin DSYNC Connector
44-pin Connector Port 1
Signal
Pin
Pin
Signal
FGND 1
FGND 2
FGND 33
FGND 34
RTS1+ 5
RTS1- 6
DTR1+ 7
DTR1- 8
DSR1+ 9
DSR1- 10
CTS1+ 11
CTS1- 12
DCD1+ 13
DCD1- 14
V_SD1+ 15
V_SD1- 16
SGND 26
SGND 19
V_RD1+ 21
V_RD1- 22
V_TT1+ 23
V_TT1- 24
UNBENB1 31
V35E1 32
1 FGND
4 RTS+
18 RTS-
8 DTR+
22 DTR-
6 DSR+
20 DSR-
5 CTS+
19 CTS-
9 DCD+
23 DCD-
2 SD+
38 VSD+
16 SD-
36 VSD-
43 GND
7 SGND
44 SGND
3 RD+
37 VRD+
17 RD-
35 VRD-
12 TT+
40 VTT+
26 TT-
39 VTT-
41 UNBE
42 V35D

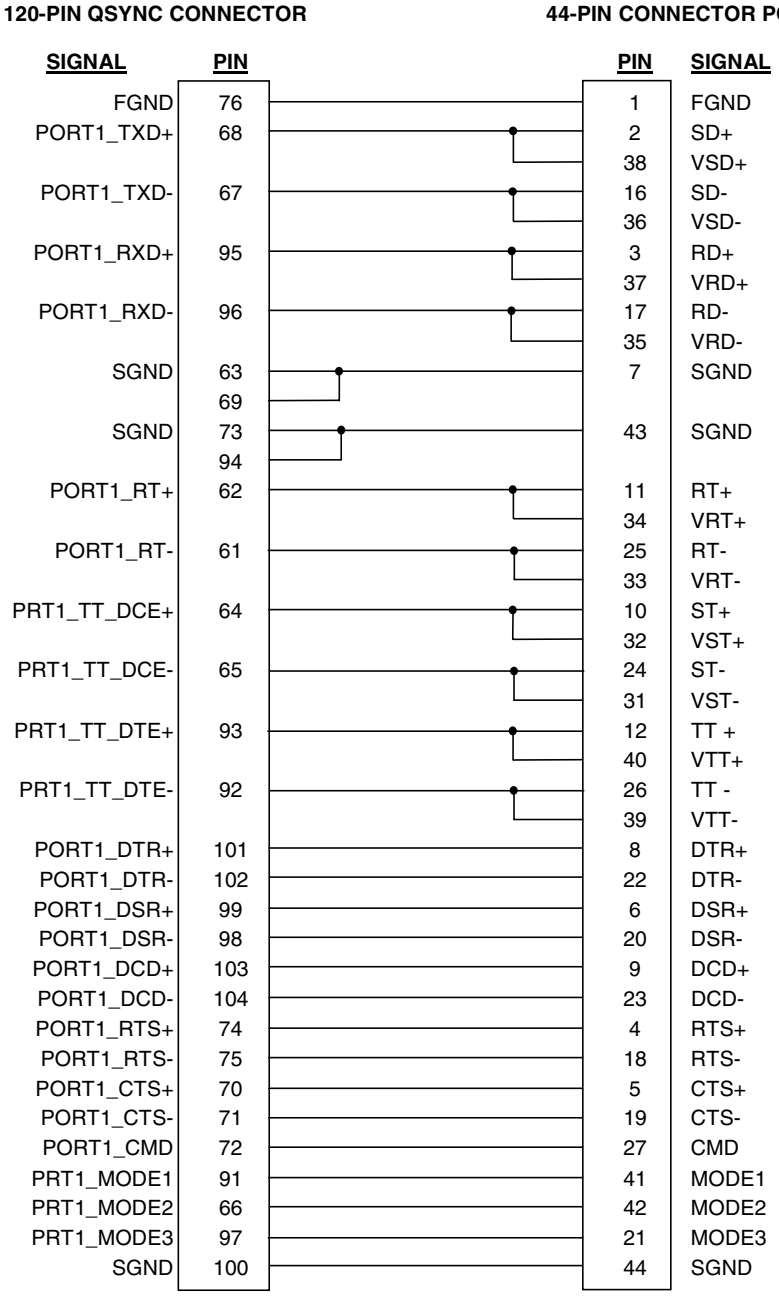

68-pin DSYNC Connector
44-pin Connector Port 2
Signal
Pin
Pin
Signal
FGND 35
FGND 36
FGND 67
FGND 68
RTS2+ 39
RTS2- 40
DTR2+ 41
DTR2- 42
DSR2+ 43
DSR2- 44
CTS2+ 45
CTS2- 46
DCD2+ 47
DCD2- 48
V_SD2+ 49
V_SD2- 50
SGND 54
SGND 53
V_RD2+ 55
V_RD2- 56
V_TT2+ 57
V_TT2- 58
UNBENB2 65
V35E2 66
1 FGND
4 RTS+
18 RTS-
8 DTR+
22 DTR-
6 DSR+
20 DSR-
5 CTS+
19 CTS-
9 DCD+
23 DCD-
2 SD+
38 VSD+
16 SD-
36 VSD-
43 GND
7 SGND
44 SGND
3 RD+
37 VRD+
17 RD-
35 VRD-
12 TT+
40 VTT+
26 TT-
39 VTT-
41 UNBE
42 V35D

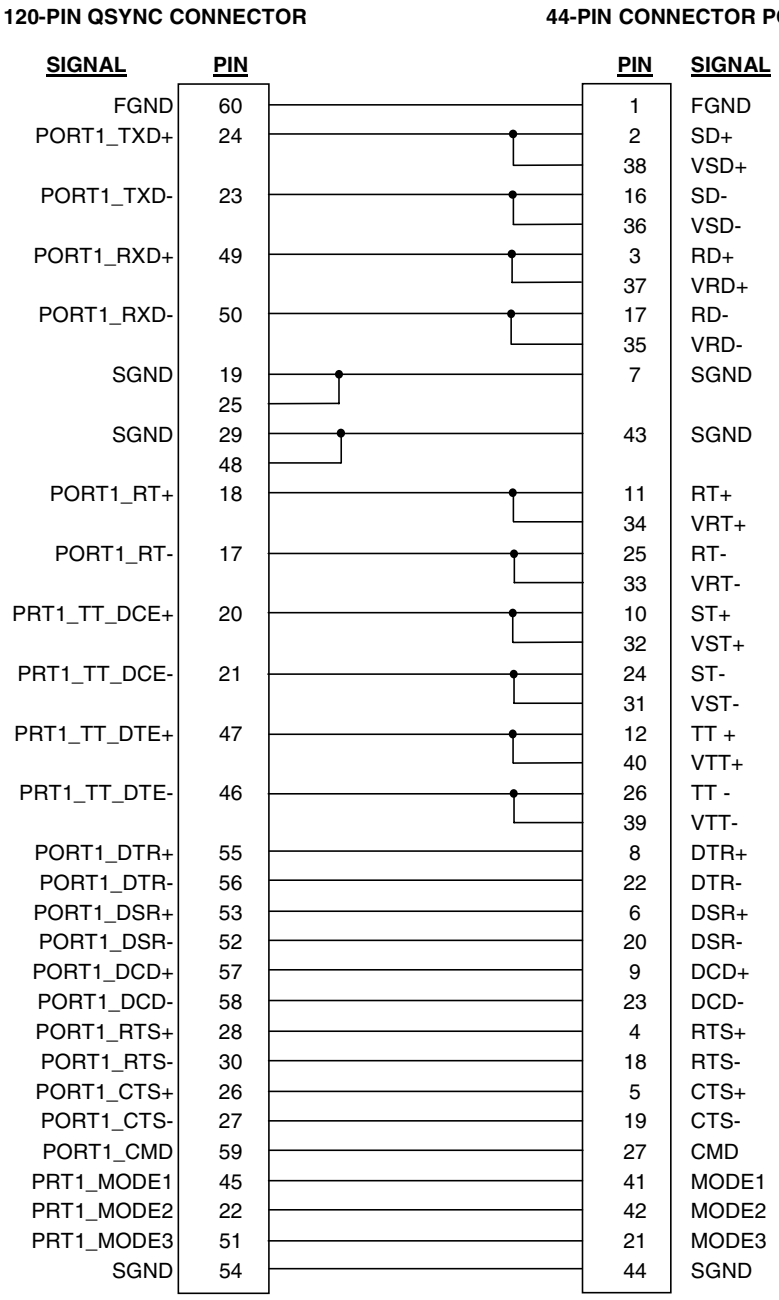
Quad Synchronous PMC Module Adapter (Order No. DU0011009)

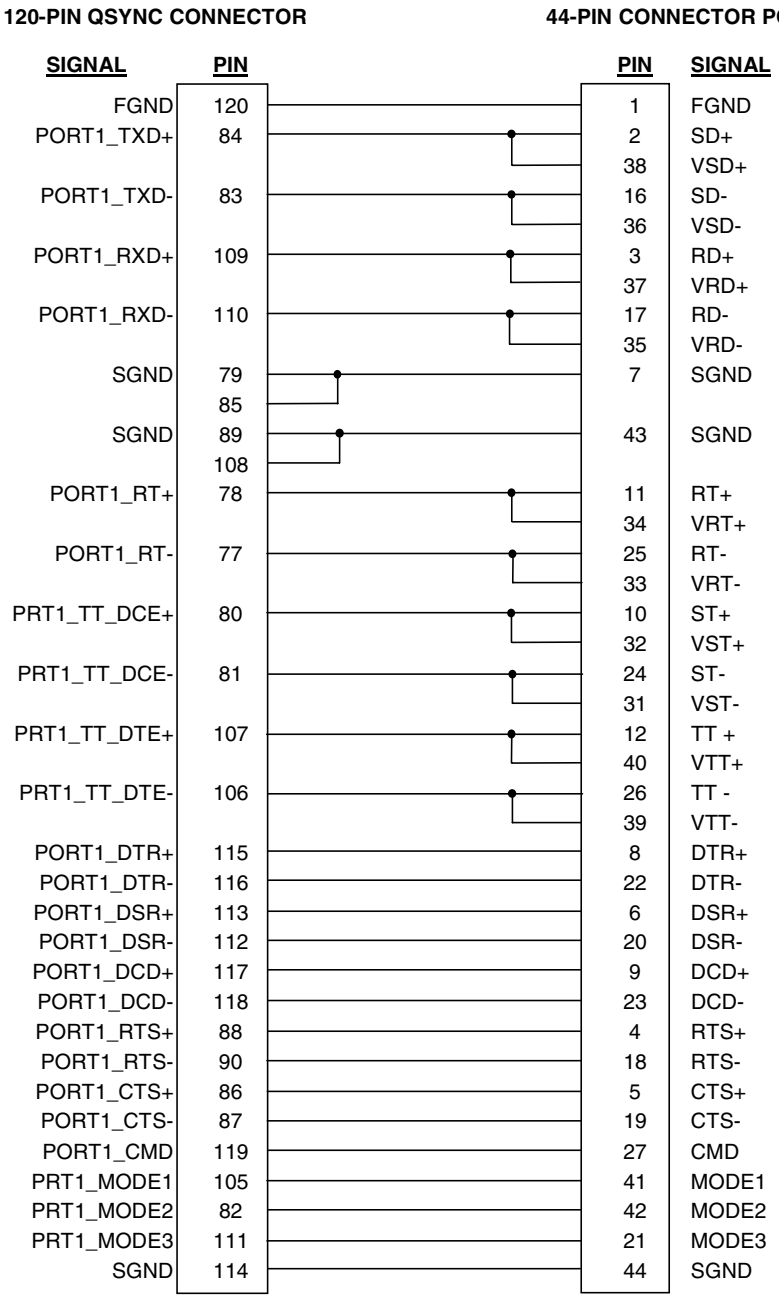
Note: The following data is intended for informational use only. Due to the complexity of this assembly, Nortel Networks does not recommend construction of this adapter assembly by the end user. Incorrect wiring may cause damage to one or more of the ports on the quad sync PMC modules. Use only Nortel Networks approved cables.




120-PIN QSYNC CONNECTOR
44-PIN CONNECTOR PORT 1
SIGNAL
PIN
PIN
SIGNAL
FGND 16 1 FGND
PORT1_TXD+ 8 2 SD+
38 VSD+
PORT1_TXD- 7 16 SD-
36 VSD-
PORT1_RXD+ 35 3 RD+
37 VRD+
PORT1_RXD- 36 17 RD-
35 VRD-
SGND 3 7 SGND
9
SGND 13 43 SGND
34
PORT1_RT+ 2 11 RT+
34 VRT+
PORT1_RT- 1 25 RT-
33 VRT-
PRT1_TT_DCE+ 4 10 ST+
32 VST+
PRT1_TT_DCE- 5 24 ST-
31 VST-
PRT1_TT_DTE+ 33 12 TT +
40 VTT+
PRT1_TT_DTE- 32 26 TT -
39 VTT-
PORT1_DTR+ 41 8 DTR+
PORT1_DTR- 42 22 DTR-
PORT1_DSR+ 39 6 DSR+
PORT1_DSR- 38 20 DSR-
PORT1_DCD+ 43 9 DCD+
PORT1_DCD- 44 23 DCD-
PORT1_RTS+ 14 4 RTS+
PORT1_RTS- 15 18 RTS-
PORT1_CTS+ 10 5 CTS+
PORT1_CTS- 11 19 CTS-
PORT1_CMD 12 27 CMD
PRT1_MODE1 31 41 MODE1
PRT1_MODE2 6 42 MODE2
PRT1_MODE3 37 21 MODE3
SGND 40 44 SGND


120-PIN QSYNC CONNECTOR
44-PIN CONNECTOR PORT 2
SIGNAL
PIN
PIN
SIGNAL
FGND 76 1 FGND
PORT1_TXD+ 68 2 SD+
38 VSD+
PORT1_TXD- 67 16 SD-
36 VSD-
PORT1_RXD+ 95 3 RD+
37 VRD+
PORT1_RXD- 96 17 RD-
35 VRD-
SGND 63 7 SGND
69
SGND 73 43 SGND
94
PORT1_RT+ 62 11 RT+
34 VRT+
PORT1_RT- 61 25 RT-
33 VRT-
PRT1_TT_DCE+ 64 10 ST+
32 VST+
PRT1_TT_DCE- 65 24 ST-
31 VST-
PRT1_TT_DTE+ 93 12 TT +
40 VTT+
PRT1_TT_DTE- 92 26 TT -
39 VTT-
PORT1_DTR+ 101 8 DTR+
PORT1_DTR- 102 22 DTR-
PORT1_DSR+ 99 6 DSR+
PORT1_DSR- 98 20 DSR-
PORT1_DCD+ 103 9 DCD+
PORT1_DCD- 104 23 DCD-
PORT1_RTS+ 74 4 RTS+
PORT1_RTS- 75 18 RTS-
PORT1_CTS+ 70 5 CTS+
PORT1_CTS- 71 19 CTS-
PORT1_CMD 72 27 CMD
PRT1_MODE1 91 41 MODE1
PRT1_MODE2 66 42 MODE2
PRT1_MODE3 97 21 MODE3
SGND 100 44 SGND


120-PIN QSYNC CONNECTOR
44-PIN CONNECTOR PORT 3
SIGNAL
PIN
PIN
SIGNAL
FGND 60 1 FGND
PORT1_TXD+ 24 2 SD+
38 VSD+
PORT1_TXD- 23 16 SD-
36 VSD-
PORT1_RXD+ 49 3 RD+
37 VRD+
PORT1_RXD- 50 17 RD-
35 VRD-
SGND 19 7 SGND
25
SGND 29 43 SGND
48
PORT1_RT+ 18 11 RT+
34 VRT+
PORT1_RT- 17 25 RT-
33 VRT-
PRT1_TT_DCE+ 20 10 ST+
32 VST+
PRT1_TT_DCE- 21 24 ST-
31 VST-
PRT1_TT_DTE+ 47 12 TT +
40 VTT+
PRT1_TT_DTE- 46 26 TT -
39 VTT-
PORT1_DTR+ 55 8 DTR+
PORT1_DTR- 56 22 DTR-
PORT1_DSR+ 53 6 DSR+
PORT1_DSR- 52 20 DSR-
PORT1_DCD+ 57 9 DCD+
PORT1_DCD- 58 23 DCD-
PORT1_RTS+ 28 4 RTS+
PORT1_RTS- 30 18 RTS-
PORT1_CTS+ 26 5 CTS+
PORT1_CTS- 27 19 CTS-
PORT1_CMD 59 27 CMD
PRT1_MODE1 45 41 MODE1
PRT1_MODE2 22 42 MODE2
PRT1_MODE3 51 21 MODE3
SGND 54 44 SGND


120-PIN QSYNC CONNECTOR
44-PIN CONNECTOR PORT 4
SIGNAL
PIN
PIN
SIGNAL
FGND 120 1 FGND
PORT1_TXD+ 84 2 SD+
38 VSD+
PORT1_TXD- 83 16 SD-
36 VSD-
PORT1_RXD+ 109 3 RD+
37 VRD+
PORT1_RXD- 110 17 RD-
35 VRD-
SGND 79 7 SGND
85
SGND 89 43 SGND
108
PORT1_RT+ 78 11 RT+
34 VRT+
PORT1_RT- 77 25 RT-
33 VRT-
PRT1_TT_DCE+ 80 10 ST+
32 VST+
PRT1_TT_DCE- 81 24 ST-
31 VST-
PRT1_TT_DTE+ 107 12 TT +
40 VTT+
PRT1_TT_DTE- 106 26 TT -
39 VTT-
PORT1_DTR+ 115 8 DTR+
PORT1_DTR- 116 22 DTR-
PORT1_DSR+ 113 6 DSR+
PORT1_DSR- 112 20 DSR-
PORT1_DCD+ 117 9 DCD+
PORT1_DCD- 118 23 DCD-
PORT1_RTS+ 88 4 RTS+
PORT1_RTS- 90 18 RTS-
PORT1_CTS+ 86 5 CTS+
PORT1_CTS- 87 19 CTS-
PORT1_CMD 119 27 CMD
PRT1_MODE1 105 41 MODE1
PRT1_MODE2 82 42 MODE2
PRT1_MODE3 111 21 MODE3
SGND 114 44 SGND

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